A STUDY OF ATTENTION DEFICIT HYPERACTIVITY DISORDER CHILDREN IN RELATION TO THEIR COGNITIVE AND AFFECTIVE VARIABLES

Dissertation

Submitted To University Of Kashmir in Partial Fulfillment of the Requirement for the Award of the Degree of

Master of Philosophy (M. Phil)

In

PSYCHOLOGY

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CERTIFICATE

This is to certify that the dissertation entitled **"A study of Attention Deficit Hyperactivity Disorder (ADHD) Children in relation to their cognitive and affective variables",** which is being submitted by **Asifa Ashraf,** for the award of **M.Phil Degree** in the Department of Psychology, University of Kashmir is a record of her own work, carried out under my supervision and guidance.

Dr. Touseef Rizvi

Supervisor

Sr. Assistant Professor
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Asifa Ashraf

Declaration

I hereby declare that the Dissertation entitled **"A study of Attention Deficit Hyperactivity Disorder (ADHD) Children in relation to their cognitive and affective variables"** is the result of an independent investigation. Wherever the work is indebted to the work of others it has been acknowledged and cited. I declare that this dissertation has not been accepted in substance for any other degree or diploma in this or other university.

Asifa Ashraf
Investigator

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ABSTRACT

This present study aimed to identify the ADHD children and examine their relationship with cognitive and affective variables. This study was conducted on a sample of N=80 children comprising of 40 ADHD and 40 Non-ADHD children. Their age ranged from 12 to 14 years. ADHD children were identified with [Vanderbilt diagnostic rating scale (VDRS, 1998) teacher version (VDTRS) & parent version (VDPRS)] based on DSM-IV criteria. To study the cognitive and affective variables of ADHD and non-ADHD children following instruments were used. (i) Gardner multiple intelligence tests (1983) was used to study the multiple intelligences. (ii) Academic achievement was obtained from the school records of children. (iii) Behavior checklist list of (Achenbach & Rescorla, 1991) was used to assess behavioral problems and (iv) Emotional characteristics were assessed by test developed (Gupta & Singh, 1985). The results revealed that inattention type was predominant in girls whereas in boys hyperactive and combined types were found more. Results also revealed that significant differences were found in both cognitive and affective variables in comparison to controls. It was found that ADHD children have lower intelligences in these areas i.e Naturalistic, Musial, spatial-visual, logical-mathematical, interpersonal and intrapersonal intelligences than linguistic and bodily-kinesthetic. Behavior showed more internalizing & externalizing problem, social problem, thought problem, total problem and rule-breaking behavior than aggression, withdrawal, somatic complaint and depression. Whereas low emotional control and lower level of academic achievement was seen in ADHD children.

We worry about what a child becomes tomorrow, yet we forget that he is someone today (Stacia, 2009). Children are blessings from the Lord. With these blessings also come responsibilities. Parents and teachers have responsibilities for helping children to grow physically, intellectually, emotionally and spiritually. Social institutions like, home and school have responsibility towards children to provide an environment, in which children are safe, are taught at an age appropriate level, and are encouraged to develop healthy relationship with the environment. But some children are not so lucky to have an enjoyable childhood because they suffer from various childhood disorders which prevent them to understand the world in their own way. For understanding the world these children should pay full attention what is going around them. Paying attention is a big question for many of the children; they cannot continuously concentrate on things, the lack of attention is followed by over activity. The disorder which develops due to lack of concentration and over activity is known as Attention deficit hyperactivity disorder (ADHD).

Attention-deficit/hyperactivity disorder (ADHD) is characterized by inattention, impulsivity, and hyperactivity and has recently been estimated to affect 3.5 % of school-aged children worldwide (Polanzcyk, Sherman & Biederman, 2007) being one of the most common psychiatric disorders among children (American Psychiatric Association [APA] 2000). Based on the pattern of symptoms present, the Diagnostic and Statistical Manual (DSM-IV; APA, 1994) distinguishes three subtypes of ADHD, the inattentive, the hyperactive/impulsive, and the combined subtype. The latter is by far the most common. Although ADHD symptoms tend to decline with age, at least 50% of children with ADHD will still experience impairing symptoms in adulthood (Faraone, Biederman, & Mick, 2006) in other words, it is a chronic and sometimes life-long disorder.

Researchers have reported that ADHD is diagnosed two to four times more frequently in boys than in girls (Dulcan & Singh, 2008). It is reported that boys are generally diagnosed around age 7, while girls are typically diagnosed around age 12. In other words, if these girls do receive a diagnosis, it occurs on average five years later than boys (Sergant, Wolphe, & Guran, 2001). Researchers found that girls are also more likely to display the "predominately inattentive type" of ADHD and in boys "hyperactive-impulsive type" is most common. In girls symptoms may increase during the middle and high school as demands and responsibilities at school increase and social issues become more complicated (Jain et al., 2006).

Many researchers (Gresham, Murray, Rosen & et al., 1998) agreed on the fact that if a girl does have the hyperactive/impulsive aspect of ADHD, her symptoms may still present a bit differently than in boys. She may be hyper-social, hyper-talkative and verbally impulsive -- interrupting others, talking excessively, changing topics again and again during conversations, and saying or blurting out words without thinking about their impact on others. She may also be overemotional, a "drama queen," and easily excitable. *Signs of ADHD in girls:* Researchers have identified many symptoms that are most common in girls i.e. Difficulty in maintaining and shifting focus, easily distracted Disorganized and "messy", Forgetful, Difficulty completing tasks, Daydream, Slow to process information and directions (It may even appear that they aren't hearing) Careless, Often late (poor time management), Hyper-talkative, Verbally impulsive (blurts out, interrupts others), Easily upset, over-reactive. *Signs of ADHD in Boys:* Jogger, Haden and Jeffer (2001) reported that they frequently misplace or lose their belongings; desks, back packs, lockers, and their room will be extremely messy and chaotic, they show little or no awareness of time, will often underestimate the length of time a task requires to complete, they tend to procrastinate, have a high degree of emotionality, such as temper outbursts, quick to anger, can get upset pretty quickly, are irritable and moody, Are easily frustrated, overly reactive, have some difficulty with

transitions and changes in their routine or activity, can display aggressive behavior, parents have difficulty in disciplining them. They suffer from poor self esteem issues, Find it difficult to work for long periods or long term goals, Have poor handwriting, fine motor skills, written expression and output – problems getting their ideas on paper, Can be overly sensitive to sounds and other stimuli in their environment, Suffer from motivational difficulties, they may receive a lot of negative attention and interaction from their peers or adults, they suffer from learning and school performance difficulties; not achieving or performing to a level that is expected from them to their apparent ability.

Normal behavior vs. ADHD

Before understanding ADHD one should first differentiate between ADHD and normal behaviour. Researchers (Ramsey & Russell, 2007) are of the opinion that most healthy children are inattentive, hyperactive or impulsive at one time or another. For instance, parents may worry that a 3-year-old who can't listen to a story from beginning to end may have ADHD. But it's normal for children to have short attention spans and be unable to stick with one activity for long. Even in older children and adolescents, attention span often depends on the level of interest. Most teenagers can listen to music or talk to their friends for hours but may be a lot less focused about homework. The same is true of hyperactivity. Young children are naturally energetic — they often wear their parents out long before they're tired. And they may become even more active when they're tired, hungry, anxious or in a new environment. In addition, some children just naturally have a higher activity level than do others. Children should never be classified as having ADHD just because they're different from their friends or siblings. Children who have problems in school but get along well at home or with friends are likely struggling with something other than ADHD. The same is true of children who are hyperactive

or inattentive at home, but whose schoolwork and friendships remains unaffected (Hassel, Joseph, Jennifer & et al., 2006).

ADHD may be seen as one or more continuous traits found normally throughout the general population (Davis & Peterburg, 2000). It is a developmental disorder in which certain traits such as impulse control lag in development. Using magnetic resonance imaging of the prefrontal cortex, this developmental lag has been estimated to range from 3 to 5 years (Harry, Davis & Jones, 2004). ADHD is classified as a disruptive behavior disorder along with oppositional defiant disorder, conduct disorder and antisocial disorder (Winer, Jerry & Editor, 2003).

Evolution of ADHD

ADHD actually has a long history. In the mid-19th century, the characteristics of ADHD were described by Heinrich Hoffman, a German physician, and represented by 2 of his characters—Fidgety Phil and Harry "Who looks in the Air"—who appear in his children's book (Hoffman, 1848). In 1902, at a meeting of the Royal College of Physicians, George Still described a disease he characterized as resulting from a defect in moral character (Still, 1902). He noted that the problem resulted in a child's inability to internalize rules and limits, and in addition manifested itself in patterns of restless, inattentive, and over aroused behaviors. He suggested that the children had likely experienced brain damage but that the behavior could also arise from hereditary and environmental factors.

The belief in the association with brain damage increased in 1917–1918 following a worldwide epidemic of influenza with encephalitis, which in some recovering children resulted in symptoms of restlessness, inattention, impulsivity, easy arousbility, and hyperactivity (Ebaugh, 1923; Hohman, 1922) clear evidence of brain damage, the name of the disorder was changed to minimal cerebral/brain dysfunction/damage (Clements, 1966). As the

association with brain damage became less certain, the name was changed to be more behaviorally descriptive. The change is reflected in the psychiatric classification system, where in the Diagnostic and Statistical Manual of Mental Disorders, Second Edition (DSM-II), it was called hyperkinetic reaction of childhood disorder (American Psychiatric Association, APA, 1967). In 1980, because of the studies of Virginia Douglas and others (Douglas, 1974), the focus again shifted from considering the primary problem to be hyperactivity to considering inattention as the primary deficit as reflected in the shift of the diagnostic label to attention-deficit disorder in DSM-III (APA, 1980) and more recently, to attention-deficit/hyperactivity disorder in DSM-III-R (APA, 1987) and According to *DSM-IV* (APA, 1994), the essential feature of ADHD is ...a persistent pattern of inattention and/or hyperactivity-impulsivity which is more frequent and severe than is typically observed in individuals at a comparable level of development. Symptoms of ADHD must be present before age seven years, and must interfere with developmentally appropriate social, academic, or occupational functioning in a least two settings (for example, at home and at school, or at home and at work). Although symptoms of ADHD may be less noticeable as the person matures, or in novel, highly controlled or reinforcing situations, symptoms of inattention, hyperactivity/impulsivity, or all three, are usually present in at least two settings.

The *DSM-IV R* attempts to clarify the diagnosis of ADHD by separating symptoms of inattention from those of hyperactivity-impulsivity and denotes three separate types of ADHD. The new diagnostic criteria for the three main types specify that symptoms must have been present before age seven and have persisted for at least six months to a degree that is maladaptive and inconsistent with the child's developmental level (APA, 1994).

Diagnosis of ADHD

ADHD is diagnosed via a psychiatric assessment; to rule out other potential causes or comorbidities, physical examination, radiological imaging, and laboratory tests may be used (Philip, Shaw, and Greenstian, 2006). The DSM-IV criteria are often the basis for a diagnosis, while European countries usually use the ICD-10. If the DSM-IV criteria are used, rather than the ICD-10, a diagnosis of ADHD is 3–4 times more likely (Adler, Kessler & Amas, 2007). Factors other than those within the DSM or ICD however have been found to affect the diagnosis in clinical practice. A child's social and school environments as well as academic pressures at school are likely to be of influence (David, 2004).

Many of the symptoms of ADHD occur from time to time in everyone; in patients with ADHD, the frequency of these symptoms is greater and patients' lives are significantly impaired. Impairment must occur in multiple settings to be classified as ADHD (Jessica, Joughin, & Owems, 2005). As with many other psychiatric and medical disorders, the formal diagnosis is made by a qualified professional in the field based on a set number of criteria. In the USA these criteria are laid down by the American Psychiatric Association in their Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 4th edition. Based on the DSM-IV criteria listed below, three types of ADHD are classified:

Inattention:

1) Often does not give close attention to details or makes careless mistakes in schoolwork, work, or other activities.

2) Often has trouble keeping attention on tasks or play activities.

3) Often does not seem to listen when spoken to directly.

4) Often does not follow instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions).

5) Often have trouble organizing activities.

6) Often avoids, dislikes, or doesn't want to do things that take a lot of mental effort for a long period of time (such as schoolwork or homework).

7) Often loses things needed for tasks and activities (such as toys, school assignments, pencils, books, or tools).

8) Is often easily distracted.

9) Often forgetful in daily activities.

Hyperactivity:

1) Often fidgets with hands or feet or squirms in seat.

2) Often gets up from seat when remaining in seat is expected.

3) Often runs about or climbs when and where it is not appropriate (adolescents or adults may feel very restless).

2) Often has trouble playing or enjoying leisure activities quietly.

1) Is often "on the go" or often acts as if "driven by a motor".

2) Often talks excessively.

Impulsiveness:

1) Often blurts out answers before questions have been finished.

2) Often has trouble waiting one's turn.

3) Often interrupts or intrudes on others (example: butts into conversations or games).

ICD-10

In the tenth edition of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) the signs of ADHD are given the name "Hyperkinetic disorders". When a conduct disorder (as defined by ICD-10) is present, the condition is referred to as "Hyperkinetic conduct disorder". Otherwise the disorder is classified as "Disturbance of Activity and Attention", "Other Hyperkinetic Disorders" or "Hyperkinetic Disorders, Unspecified". The latter is sometimes referred to as, "Hyperkinetic Syndrome".

Characteristics of ADHD

According to DSM-IV Inattention, hyperactivity, and impulsivity are the key behaviors of ADHD. The symptoms of ADHD are especially difficult to define because it is hard to draw the line at where normal levels of inattention, hyperactivity, and impulsivity end and clinically significant levels requiring intervention begin (Brown, Paul, & Lee, 2001). To be diagnosed with ADHD, symptoms must be observed in two different settings for six months or more and to a degree that is greater than other children of the same age (Balint, Czobor, & Simon, 2008).

Inattention: commonly hyperactive children fail to finish things that they start often such children don't seem to listen, and they appear to have incredible difficulty sustaining attention (seidel & Joschko, 1990) or staying on task for more than a few minutes at a time. As a result, it's almost inevitable that they cannot focus on school work or any other task requiring intense concentration. This short attention span shows up not only in school or work-related activities, but play as well ADHDer's usually does not play well alone,

but rather have a need to be running about, poking or otherwise disturbing playmates.

Even when they manage to hold their bodies still, the minds of hyperactive children have a tendency to wonder. While motor restlessness is usually present, mental restlessness or "under focusing" can be a problem, even during the rare calm moments. The failure of these children to maintain their concentration often causes them to make bad decisions,

They fail to follow through with tasks or chores, and generally get into trouble, with many cases of ADHD, the problem is not only motoric-overactivity, but lack of concentration when at rest (Kinsbourne & Swanson, 1978). Selective focusing is evident now and again (particularly in novel settings or with stimulating activities), but the general trend is towards daydreaming & mental restlessness.

Overactivity: ADHD children tend to have difficulty in remaining still or staying seated – at home & at school. If asked to sit & pay attention, they have trouble in restraining themselves & often fidget in "worry squirmy" fashion. In DSM-IV, it is stated quite accurately-that hyperactive children are constantly "on the go" as if "driven by motor".

At home, overactive children run about or climb all over the place and they frequently move excessively even during sleep. In school, teachers often report, in despair that hyperactive kids simply cannot sit still. Such children typically wiggle their legs on arms, fiddle with objects, or move their bodies as if they just have to get up. Many try to leave their seats whenever possible because of their tendency towards perpetual motion, hyperactive students much of their time in pestering and annoying other children in class. Teachers know the hyperactive kids the one who can't stay seated, who fidget all day long and who make the class a living hell. To identify ADHD informally, simply look at the child's clothes & they wear out much faster than normal, by way of

informal diagnosis watch for the kids who have to check out and about. Although people often think that is something physically wrong with these children they usually just need to move. In other words they have to go. One can often pick out the over active kids by their pencils, which are usually reduced to tiny shrunken stubs, when they are confined to their seats for longer than they can possibly stand. Therefore these kids are tough to manage in the classroom.

Impulsivity: over active children often act quickly, without thinking they lack impulse control, in that they want what they want when they want it. Because of this trait, ADHDer's naturally have trouble in following rules or waiting their turn "Such children make bad decisions, often by moving when it's wise to be still" (Kinbourne & Swanson, 1978). They may run into streets without looking, dive into swimming pools without checking the depth of the water (or even without knowing how to swim). Melmed (2001) has remarked that ADHD kid's exhibit defective hind sight (they don't seem to learn from experience) defective for thought (they don't plan ahead efficiently) and an unrealistic diminished sense of time (they do not know how long things take).

Not unexpectedly given their propensity for acting so impulsively, hyperactive-youngsters tend to get into accidents. This is not to say all overactive kids are physically accident-prone by any means. Many are agile, active and known for their ability to escape from dicey situations sometimes though their reputation for invulnerability is exaggerated; several of these kids escape a lot precisely because they get into so many scrapes. In many instances however it eventually catches up with them, and physical injury does result. Since many of these youngsters run headlong into unfamiliar situations, it is not surprising that hospital records shows that ADHD children, do in fact, end up paying more than their share of visits for repairs (for broken bones, eyes injuries & such).

Distractibility: Schuerholz et al. (1995) found that hyperactive children often fail to finish tasks, largely because they all are easily distracted from the work at hand. While they may be easily interested in something and focus on it for a brief time they tend to fly away the moment something else captures their attention. To illustrate, such children may be totally engrossed in a television show, but the moment new idea strikes them they head off in a completely different direction (forgetting what they were doing at the first place). A few minutes later, they may be off again to something else. It appears that these hyperactive children are not only easily distracted but they need and "welcome" distraction. It's part of who they are.

In our experience, ADHD children can on occasion, stick with certain tasks. Some for example, seem able to concentrate reasonably well on video and computer games. For the most part though hyperactive children rarely focus on one activity for more than four or five minutes at a time and often end up jumping widely from game to game even on computer they are at the machine, but not able to focus on just one thing. This distractibility makes them very difficult to manage in the classroom, where they are setting. Because they cannot concentrate on a single activity for any length of time (tending instead to switch back and forth from task to task, attention deficit children frequently end up learning great deal off irrelevant material is being taught. Thus, while these youngsters may learn certain things in school, it is usually not what they expected to learn.

Excitability: Goldman-Rakic (1994) in his research with ADHD children typically have what might be termed low frustration tolerance or, to put it more colloquially, "short focuses" although they want to have playmates, they are often upset or "set off" by them. Hyperactive active children are easily excited; they get into kerfuffle's with other children, and then taken to task by parents or teachers, tend to be extremely emotional and in a mad rush to explain their

side of story. While as hyperactivity does not manifest in a malevolent or malicious ways.

Excitability can cause all sorts of problems for hyperactive children many researchers (Wilkniss, 1997) have noticed that many ADHD kids are extremely apologetic, they get into trouble, feel bad about it, and apologizes non-stop, and promise sincerely to do better next time around. But they can't and they don't. Despite a genuine desire to be good & to improve they are unable to retrain themselves or settle down. Then, of course, parents and teachers feelings betrayed and tied to get extremely upset, & then whole situation escalates (leading to ultimatums, threats, & tensions).

Disorganization: According to DSM-IV (1994) children with attention deficit disorder often "have difficulty organizing tasks and activities". Over active youngsters typically manage work & play and their hyper disorganization can affect the lives of others. At school, over active inattentive kids are at a great disadvantage because they can't keep themselves or their belongings straight. ADHD students require ongoing and intense supervision. They are unable to stay on track without it. Organizational issue become a real concern both at home at school, with kids continually mislaying or losing supplies, books, and even treasured possession. Parents of hyper active children can usually be found near schools lost and found belonging they virtually live there.

Executive Functioning

Executive functioning (EF) is the ability to maintain an appropriate and efficient problem-solving set for attainment of a future goal (Bianchi, 1922; Lezak, 1985; Luria, 1966). Brown (2006), in describing EF, uses a metaphor of a conductor of a symphony. Just as there are numerous parts of the brain that all function differently, so are there many musicians in a symphony. The role of the conductor is to integrate the functions of these musicians in the

execution of a musical composition, from indicating when to start the piece, to keeping time, to modulating dynamics. The frontal lobe of the brain performs a similar function in that it helps to manage cognitive functions that assist in tasks such as programming and planning of goal oriented motor skill behaviour, modulation of behaviour in light of expected future consequences, anticipation of events in the regulation of behaviour, learning of contingency rules and the ability to use feedback cues, inhibition of response set and flexibility (versus perseveration), abstract reasoning, problem-solving, sustained attention, and concentration (Seguin, Phil, Harden, Tremblay, & Boulerice, 1995).

The term *executive function refers* to a wide range of central cognitive functions that play a critical role for all individuals as they manage multiple tasks of daily life. One theory of EF includes the following six clusters of cognitive functions that tend to be impaired in individuals with ADHD.

1. Activation: organizing tasks and materials, estimating time, prioritizing tasks, and getting started on work tasks. Patients with ADHD describe chronic difficulty with excessive pro- crastination. They often put off getting started on a task—even a task they recognize as very important to them—until the last minute. It is as if they cannot get themselves started until the point at which they perceive the task to be an acute emergency.

2. Focus: focusing, sustaining focus, and shifting focus to tasks. Some describe their difficulty in sustaining focus as similar to trying to listen to the car radio when driving too far away from the station, at which point the signals begins fading in and out: you get some of it and lose some of it. They say they are distracted easily not only by things that are going on around them but also by their own thoughts. In addition, focus on reading poses difficulties for many. Words are generally understood as they are read but often have to be read over and over for the meaning to be fully grasped and remembered.

3. Effort: regulating alertness, sustaining effort, and processing speed. Many with ADHD report they can perform short-term projects well but have much more difficulty with sustained effort over longer periods of time. They also find it difficult to complete tasks on time, especially when required to do expository writing. Many also experience chronic difficulty regulating sleep and alertness. They often stay up too late because they cannot shut their head off. Once asleep, they often sleep like dead people and have a big problem getting up in the morning.

4. Emotion: managing frustration and modulating emotions. Although the *DSM-IV* does not recognize any symptoms related to managing emotion as an aspect of ADHD, many with this disorder describe chronic difficulties managing frustration, anger, worry, disappointment, desire, and other emotions. They speak as if these emotions, when experienced, take over their thinking as a computer virus invades a computer, making it impossible for them to give attention to anything else. They find it very difficult to get the emotion into perspective, to put it to the back of their mind, and to get on with what they need to do.

5. Memory: using working memory and accessing recall. People with ADHD very often report that they have adequate or exceptional memory for things that happened long ago but great difficulty remembering where they just put something, what someone just said to them, what they have just read, or what they were about to say. They may describe difficulty holding one or several things “on line” while attending to other tasks. In addition, individuals with ADHD often complain that they cannot pull information they have learned out of memory when they need it.

6. Action: monitoring and regulating self-action. Many individuals with ADHD, even those without Problems of hyperactive behaviour, report chronic problems in regulating their actions. They often are too impulsive in what they say or do and in the way they think, jumping too quickly to inaccurate

conclusions. People with ADHD also report problems in monitoring the context in which they are interacting. They fail to notice when other people are puzzled, hurt, or annoyed by what they have just said or done and thus fail to modify their behaviour in response to specific circumstances. They also often report chronic difficulty in regulating the pace of their actions, in slowing self and/or speeding up as needed for specific tasks.

EF has been found to be a distinct set of cognitive skills when compared to intelligence. Although some skills may overlap, individuals who have sustained damage to areas of the Prefrontal cortex show deficits in reasoning tasks related to EF while sustaining normal and intact levels of intelligence (Waltz, Knowlton, & Holyoak, 1999). Some investigators have found specific IQ test profiles that show lower performance by children with ADHD on the Arithmetic, Coding, Information, Digit Span, and Symbol Search subtests of the Wechsler intelligence tests (Dykman, Ackerman, & Oglesby, 1980). The overall IQ scores of these individuals are then lowered because of performance on these specific subtests. Besides the Information subtest, all others are part of the Working Memory or Processing Speed indexes of the WISC-IV (Wechsler Intelligence Scale for Children, Fourth Edition; Wechsler, 2003*)*.

According to the Cattell-Horn-Carroll (CHC) theory of intelligence, general intelligence is a latent structure that includes performance in numerous areas of functioning (fluid reasoning, Language knowledge and use, memory and learning, visual and auditory perceptive, retrieval ability, cognitive speed, and reaction time speed) (Carroll, 1993). Therefore, it is possible that children with ADHD have difficulty with some of these skills because they are very similar to those measured by EF tests. However, performance on these tasks is combined with that on verbal and perceptual reasoning tasks for an overall IQ score, which would then dilute the correlation between EF and intelligence. Schuck and Crinella (2005) found minimal correlations between EF measures and all subtests of the Wechsler Intelligence Scale for Children – Third Edition

(WISC-III; Wechsler, 1992) in 123 boys with ADHD. Therefore, because intelligence is typically measured combining many factors of the CHC theory, the potential for high correlations with EF is lowered.

EF deficits have also been related to several psychological disorders and developmental delays, such as Attention-Deficit/Hyperactivity Disorder (ADHD) and autism. Individuals with ADHD, phenylketonuria (PKU), and specific learning disabilities have been found to have impaired levels of EF performance while exhibiting general intelligence within the normal range (Blair, Zelazo & Greenberg, 2005). Thus, measured intelligence can appear unaffected while measured EF can be much lower than expected given intelligence scores, suggesting that multiple cognitive processes are at work.

Barkley's Theory of ADHD and Executive Functioning

Barkley (1997; 2006) articulated an integrative theory of ADHD because he believed that the existing theory of ADHD merely described two behavioral deficits (inattention and hyperactivity-impulsivity) and failed to account for many other cognitive and behavioral deficits associated with the disorder. Therefore, he set out to create a more unifying theory of the disorder, proposing that the primary deficit in ADHD is impairment in response inhibition, which leads to disruption in performance of EFs. Barkley (1997; 2006) posited that successful behavioral inhibition sets the stage for four executive functions to occur: nonverbal working memory, verbal working memory, self-regulation of affect/motivation/arousal, and reconstitution. Therefore, once a person successfully inhibits an automatic or ongoing response pattern, that individual may then precede to the executive function processes. However, a person with ADHD is likely to have poor behavioral inhibition, leading to deficits in these areas of executive functioning which may lead to less overall success in the execution of goal-directed behaviour.

Barkley (1997; 2006) defined behavioral inhibition as three interrelated processes: "(a) inhibition of the initial prepotent response to an event; (b) stopping of an ongoing response, which thereby permits a delay in the decision to respond; and (c) the protection of this period of delay and the self-directed responses that occur within it from disruption by competing events and responses". In this light, Barkley characterized the primary underlying mechanism of ADHD as a deficit in behavioral inhibition and executive control of behavior, through which inattention becomes a secondary symptom.

It is believed that behavioral inhibition is the first self-regulatory act in responding, as it allows more time to generate alternate responses, anticipate consequences of various responses, and make an appropriate choice of future behavior. Barkley (1997) asserted that the four executive functions affect two types of sustained attention: contingency-shaped and motor control. Specifically, he argued that immediate contextual factors (e.g., novelty of the task, reinforcement, and delay of reinforcement) govern the attention level demonstrated, which could then affect task performance. It has been found that performance of individuals with ADHD tends to be more easily influenced by these contextual factors (response contingencies) compared to normal control counterparts (Douglas, 1985; Haenlein & Caul, 1987).

Research findings indicate that the cognitive deficit seen in ADHD is at the motor control rather than the attentional or information-processing stage (Sergeant, 2005), which supports Barkley's assertion that inattention in ADHD is secondary to, and results from, deficits in behavioral inhibition. Specifically, in a review of the relationship between behavioral inhibition and ADHD, Nigg (2001) reported that there is more evidence to support the inhibitory deficit when it involves suppression of a pre-potent motor response, such as the Stop or Go/No-go tests, as opposed to secondary response inhibition, such as that measured by the Stroop test. Barkley also included a motor control aspect in which self-regulation, internal representation of motivation and goals, and

novel chains of responses all influence the inhibition of impulsive motor behavior.

The first EF implicated in Barkley's theory is nonverbal working memory. Individuals with ADHD tend to have significant difficulties in nonverbal working memory when complex information must be held in mind over lengthy delays (Seidman, Biederman, & Faraone, 1995). Barkley (1997; 2006) suggested that this inability to hold information in mind can lead to impairments in imitating complex, novel, and lengthy behavioral sequences, temporal organization and regulation, and consequently, the disorganization of the syntax of motor planning and execution. Therefore, a deficiency in nonverbal working memory makes it difficult for those with ADHD to determine the times and places for appropriate and adaptive behavior, as well as the steps and sequences required to complete nonverbal tasks and activities.

The second EF proposed by Barkley is verbal working memory, which includes self-directed (internalized) speech, following rules, and moral reasoning (Kochanska, DeVet, & Goldman, 1994). Deficits in the internalization of speech have been seen among children with ADHD who had difficulty complying with directions and commands, following rules when the rules competed with rewards available for rule violation, and transferring initially learned rules to novel tasks (Conte & Regehr, 1991; Danforth, Barkley, & Stokes, 1991; Hinshaw & Melnick, 1992). Therefore, Barkley (1997; 2006) suggested that people with ADHD show deficits in creating an internalized dialogue of what they *should* be doing and with keeping long sequences of verbal information in mind, especially when required to manipulate the information and use it for a task.

Next, Barkley implicated self-regulation of affect/motivation/arousal as an EF associated with ADHD, with deficits resulting in greater emotional reactivity, fewer anticipatory emotional reactions, less capacity to regulate emotional drive and motivation for future goals, and greater dependence on

external sources for drive, motivation, and arousal. Therefore, Barkley argued that the behavior of people with ADHD is primarily under the control of immediate and external sources of reinforcement, rather than internal motivation.

Finally, Barkley included reconstitution as the fourth EF, which he described as the ability to create multiple, novel, complex, alternative response sequences. Researchers have found that people with ADHD perform poorly on verbal and organizational fluency tests (Grodzinsky & Diamond, 1992). Also included in this domain are analysis and synthesis of behavior, in which components or steps toward a response are broken down and re organized based on the demands of a new task. Furthermore, planning and goal-directed behavior are important in reconstitution. Barkley reasoned that if a person has difficulty with behavioral inhibition, that person consequently may not be able to envision multiple behavioral responses and would have a deficit in the EF of reconstitution.

Nigg's Theory of ADHD and Executive Functioning

Nigg (2006) set forth a similar theory of ADHD to Barkley's, implicating cognitive control, or EF, as primary deficits in the disorder. However, Nigg eliminates the hierarchy of behavioral inhibition with the other EFs and simply suggests that all aspects of EF are equally important. Nigg breaks down the cognitive control EFs into four areas: control of attention, control of motor response and behavior, working memory, and state regulation.

Nigg (2006) describes "control of attention" as important in selection and working memory, conflict detection, and control of interfering information/responses. Thus, this area of EF serves to filter competing information, suppress this information from working memory, and allow for more appropriate current responses. Nigg suggests that interference control and cognitive inhibition also fall into this category, in which one would put out of

mind thoughts that are not relevant to the task and select appropriate cognitions to facilitate task completion.

Nigg's *control of attention* category seems to fit most closely with Barkley's (2006) *verbal working memory* EF component in that both require the filtration of interfering cognitions for more task appropriate thoughts. Next, Nigg (2006) suggests that *control of motor response and behavior* is critical for the suppression or interruption of a prepared response, as well as the delay of any or all responding. This second area of "control" in Nigg's theory is more motor response and behaviorally oriented, rather than being cognitive and thought-process oriented. One must be able to stop a prepared or previously performed motor response in order to adapt to new task demands. Therefore, Nigg's description of this area maps on most closely to Barkley's (1997) description of behavioral inhibition.

Nigg's (2006) third EF in his theory of ADHD is *working memory*, which includes auditory, spatial, and location working memory. Specifically, Nigg asserts that working memory is distinct from interference control, as it involves additional demands such as the ability to manipulate information over a short period of time and protect it from interfering thoughts and stimuli. In addition, *planning* is included within the working memory domain and is described as the ability to mentally organize the steps for solving a problem and determining the appropriate sequence for these steps. Nigg's description of *working memory* seems to overlap most closely with Barkley's (2006) category of *nonverbal working memory*. However, with the addition of planning in Nigg's category, it may also include some of Barkley's *reconstitution* functions.

Finally, Nigg (2006) suggests state regulation to be the fourth EF in his theory, and it is described as activation, readiness to respond, or motor preparation. Furthermore, Nigg distinguishes activation from attention or vigilance in that it is the preparedness to respond and is not simply the overall alertness to surroundings. Nigg's proposed *state regulation* category of EF is

most similar to Barkley's (2006) *self-regulation of affect/motivation/arousal*. Both describe the readiness to respond, where the brain and body have to be active and attentive to the task.

Dual Pathway Theory of ADHD

Some other theories are prominent in the ADHD literature, one of which is the dual pathway theory (Sonuga-Barke, 2002, 2005). This model proposes two possible mechanisms toward ADHD: an inhibitory deficit and an altered reward/reinforcement deficit. The pathways are associated with two distinct subtypes of ADHD, one that results from dysregulation of action and poor inhibitory motor control and one that stems from delay aversion (preferring immediate small rewards over larger delayed rewards). The dysregulation of thought and action pathway (DTAP) is characterized by disinhibition, which results in consequences for both behavioral (impulsiveness, inattention, hyperactivity) and cognitive (quality and quantity of task engagement) processes. This pathway is thought to be more biological and less context dependent, and individuals with the DTAP form of ADHD are expected to be more generally cognitively impaired. The motivational style pathway (MSP) suggests that delay aversion is an acquired characteristic stemming from shortened dopaminergic reward circuits in the brain, combined with environmental factors. Tendency to be delay aversive is strengthened over time by an individual's experiences in situations where reward is delayed and reinforcement is given to shortening the delay (thus, a form of conditioning). It is suggested that delay aversion leads to both impulsivity and inattention, as an individual is likely to act quickly and impulsively if wanting rewards sooner and may also try to find stimulation in the environment to increase how"rewarding" a task is. Both pathways are proposed to be separate manifestations of ADHD symptoms, and Sonuga-Barke uses this multiple pathway theory to possibly explain some of the inconsistencies in research on neuropsychological profiles of ADHD.

Cognitive-energetic Theory of ADHD

The cognitive-energetic theory [Sergeant et al., 2001] characterizes ADHD as a lack of efficiency in information processing determined by the interaction between three processing levels: computational mechanisms of a attention, state factors, and management/executive function and posits that ADHD is associated with defects in these processes at all three levels of the theory. The first level of the model, computational mechanisms of attention, comprises the following four stages: encoding, search, decision, and motor organization. These stages are associated with basic stimulus processing. The second level of the theory, state factors, comprises three distinct energetic pools: effort, arousal, and activation. Effort is defined as the energy necessary to meet task demands. It is required when the current state of the organism does not match the task demands and is thus affected by cognitive load. It is also linked to motivation. Arousal is defined as phasic responding and occurs simultaneously with stimulus processing. It is typically influenced by stimulus intensity and novelty. Activation, finally, is defined as the tonic physiological readiness to respond and is typically affected by preparation, alertness, time of day, and task-relevant processing time. The third level, management/executive function, is defined as planning, monitoring, detection of errors, and error correction. This is the level where overseeing of basic processing takes place. The inhibitory deficits associated with ADHD are thought to arise from possible defects at all three levels of the model, but predominantly from the energetic (second) level and the cognitive (third) level. Deficits in motor organization observed in ADHD Barkley, 1997are thought to arise from defects in first level of the model, that of computational mechanisms of attention.

Developmental Considerations of Executive Functioning

EF skills, as noted earlier, have been found to be associated with brain activity in the prefrontal cortex, inferior frontal junction, premotor cortex, anterior cingulate, and cerebellum. With normal brain development, EF skills

develop and become more fine-tuned throughout childhood and adolescence. Some researchers consider EF as a multi-faceted cognitive component in which different developmental trajectories occur and maturation is reached in stages (Anderson; 1996, Anderson; 1998 & Lajoie, 1996). It has been found that the brain develops and fine-tunes itself in a back-to-front direction, beginning in the primary motor cortex, moving forward with the prefrontal cortex developing last (Gogtay, Giedd, Lusk, Hayashi, Greenstein, 2004). Therefore, cognitive development follows the sequence of functional developmental milestones, such as primary motor and sensory development, then spatial orientation, speech, and language development. Finally, the executive function and attention areas seem to be the last to develop. Evolutionarily, this order makes sense because the least important skills for survival (EF) develop last, preceded by more basic human functions.

Associated co-morbid disorders:

ADHD may accompany other disorders such as anxiety or depression. Such combinations can greatly complicate diagnosis and treatment. Academic studies and research in practice suggest that depression in ADHD appears to be increasingly prevalent in children as they get older, with a higher rate of increase in girls than in boys, and to vary in prevalence with the subtype of ADHD. Where a mood disorder complicates ADHD it would be prudent to treat the mood disorder first, but parents of children who have ADHD often wish to have the ADHD treated first, because the response to treatment is quicker (Brunsvold, and Oepen, 2008). Inattention and "hyperactive" behavior are not the only problems in children with ADHD. ADHD exists alone in only about 1/3 of the children diagnosed with it. Many co-existing conditions require other courses of treatment and should be diagnosed separately instead of being grouped in the ADHD diagnosis. Some of the associated conditions are: Oppositional defiant disorder (35%) and conduct disorder (26%) which both are characterized by antisocial behaviors such as stubbornness,

aggression, frequent temper tantrums, deceitfulness, lying, or stealing (Krull, 2007) inevitably linking these comorbid disorders with antisocial personality disorder (ASPD); about half of those with hyperactivity and ODD or CD develop ASPD in adulthood (Abikoff, & Klein 2002). Borderline personality disorder, which was according to as study on 120 female psychiatric patients diagnosed and treated for BPD associated with ADHD in 70 percent of those cases (Philipsen, 2006). Among ADHD (12%) are having Primary disorder of vigilance, which is characterized by poor attention and concentration, as well as difficulties in staying awake. These children tend to fidget, yawn and stretch and appear to be hyperactive in order to remain alert and active (Accardo, Blondis, & Whitman, 1991). Mood disorders boys diagnosed with the combined subtype have been shown likely to suffer from a mood disorder (Loeber, & Keenen, 1994). Researchers have pointed as many as 25 percent of children with ADHD have bipolar disorder. Children with this combination may demonstrate more aggression and behavioral problems than those with ADHD alone (Frick, 1993).

Anxiety disorder, which has been found to be common in girls diagnosed with the inattentive subtype of ADHD (Last & Monk, 1992). OCD is believed to share a genetic component with ADHD and shares many of its characteristics.

Causes of ADHD

The specific causes of ADHD are not known (Bailly & Lionel, 2005). There are, however, a number of factors that may contribute to, or exacerbate ADHD. They include genetics, diet, psychological and the social and physical environments.

Genetics

Twin studies indicate that the disorder is highly heritable and that genetics are a factor in about 75 percent of all cases (Comings, 1995). Hyperactivity also

seems to be primarily a genetic condition; however, other causes do have an effect (Barkely & Russell, 2006).Researchers believe that a large majority of ADHD cases arise from a combination of various genes, many of which affect dopamine transporters. Candidate genes include α2A adrenergic receptor, dopamine transporter, dopamine receptors D2/D3,(Volkow, Wang, & Kollins, 2009) dopamine beta-hydroxylase monoamine oxidase A, catecholamine-methyl transferase, serotonin transporter promoter (SLC6A4), 5HT2A receptor, 5HT1B receptor (Roman, Rohde, & Hutz, 2004) the 10-repeat allele of the DAT1 gene (Faraone, Biederman, & Chen, 1995) the 7-repeat allele of the DRD4 gene (Swanson, Flodman, & Kennedy, 2000) and the dopamine beta hydroxylase gene (DBH TaqI) (Smith, Daly & Fischer, 2003) A common variant of a gene called LPHN3 is estimated to be responsible for about 9% of the incidence of ADHD, and ADHD cases where this gene is present are particularly responsive to stimulant medication (Acosta, Burgos, & Muenke, 2004).

The broad selection of targets indicates that ADHD does not follow the traditional model of "a simple genetic disease" and should therefore be viewed as a complex interaction among genetic and environmental factors. Even though all these genes might play a role, to date no single gene has been shown to make a major contribution to ADHD (Brown, 2006).

Adoption studies states that family members share similar environment, it is possible that ADHD is transmitted by the common environment and not by the common genes. To test this hypothesis adoption studies have been conducted. If genetics (and non shared environment is the primary key factor in the development of ADHD then sibling reared apart should) be more similar than adopted sibling reared in the same family (Aaction, 1998). Early adoption studies focused on hyperactivity and confirmed that biological relatives of children who were hyperactive were more likely to have hyperactivity than the adopted relatives of these children (Cantwell, 1975; Morrison and Steweart,

1971). A more recent study employing DSM-III-R ADHD diagnostic criteria also found that the biological relatives of children with ADHD are more likely to have ADHD than their adopted relatives (Sprich, Biederman, & Crawford, 2000).

Evolutionary theories

These theorists have proposed that hyperactivity may be an adaptive behavior in pre-modern humans (Sandlee, Hartmann, & Darwin, 1999) and that those with ADHD retain some of the older "hunter" characteristics associated with early pre-agricultural human society. According to this theory, individuals with ADHD may be more adept at searching and seeking and less adept at staying put and managing complex tasks over time (William & Taylor, 2006). Further evidence showing hyperactivity may be evolutionarily beneficial was put forth in 2006 in a study which found it may carry specific benefits for certain forms of ancient society. In these societies, those with ADHD are hypothesized to have been more proficient in tasks involving risk or competition (i.e. hunting, mating rituals, etc.) (Padella, Smucker, & Shrout, 2003). A genetic variant associated with ADHD (DRD4 48bp VNTR 7R allele), has been found to be at higher frequency in more nomadic populations and those with more of a history of migration (Chen, Burton, Greenberger, & etal., 1999). Consistent with this, another group of researchers observed that the health status of nomadic Ariaal men was higher if they had the ADHD associated genetic variant (7R alleles). However in recently sedentary (non-nomadic) Ariaal those with 7R alleles seemed to have slightly worse health (Eisenberg, Campbell, Gray & etal., 2008).

Environmental

Twin studies till date have suggested that approximately 9 to 20 percent of the variance in hyperactive-impulsive-inattentive behavior or ADHD symptoms can be attributed to non-shared environmental (non-genetic) factors (Levy,

Sherman, and et al. 1997). Environmental factors implicated include alcohol and tobacco smoke exposure during pregnancy and environmental exposure to lead in very early life (Braun, Kahn, Froehlich & et al. 2006). The relation of smoking to ADHD could be due to nicotine causing hypoxia (lack of oxygen) to the fetus in uterus (Dhal, Davison, & Cutler, 2005). It could also be that women with ADHD are more likely to smoke (Callen, Vancent & Russell, 2008) and therefore, due to the strong genetic component of ADHD, are more likely to have children with ADHD (Joesph, 2008). Complications during pregnancy and birth—including premature birth—might also play a role (Keenan, Hall & Marshall, 2008) ADHD patients have been observed to have higher than average rates of head injuries (Conner's & Wherry, 1979). Infections during pregnancy, at birth, and in early childhood are linked to an increased risk of developing ADHD. These include various viruses (measles, varicella, rubella, enterovirus 71) and streptococcal bacterial infection (Millichap, 2008). Recent study linked the organophosphate insecticide chlorpyrifos, which is used on some fruits and vegetables, with delays in learning rates, reduced physical coordination, and behavioral problems in children, especially ADHD (Setevenson, 2010).

A study found that pesticide exposure is strongly associated with an increased risk of ADHD in children. Researchers analyzed the levels of organophosphate residues in the urine of more than 1,100 children aged 8 to 15 years old, and found that those with the highest levels of dialkyl phosphates, which are the breakdown products of organophosphate pesticides, also had the highest incidence of ADHD. Overall, they found a 35 percent increase in the ODD's of developing ADHD with every 10-fold increase in urinary concentration of the pesticide residues. The effect was seen even at the low end of exposure: children who had any detectable, above-average level of pesticide metabolite in their urine were twice as likely as those with undetectable levels to record symptoms of ADHD (Kelin & Sarah, 2010).Three longitudinal studies examined environmental exposure to organophosphate pesticides

between pregnancy and grade school. Although the studies varied in techniques to measure pesticide exposure, they reached similar conclusions. Children exposed to higher levels of organophosphates during pregnancy were more likely to have lower IQs and problems focusing or solving problems. One study suggested that genetics play a strong role in whether exposure to organophosphates causes damage. Twin studies found higher rates of ADHD diagnosis among children exposed to higher levels of organophosphate pesticides (Maugh & Thomas, 2010).

Other factors affecting ADHD:

Diet

In the early 1970s, Dr. Benjamin Feingold generated a firestorm of excitement and controversy by asserting that certain foods and food additives could trigger ADHD. Slowly, researchers began testing Feingold's claim. The first study, conducted by Conners and his colleagues at the University of Pittsburgh and published in 1979, found that at least four of 15 children diagnosed with ADHD improved on a diet free of artificial colors and flavours. Over the next two decades, almost two dozen more controlled trials followed, most of which focused on food dyes. In some cases, children were put on a diet that lacked many food additives and then "challenged" with dyes. In other cases, the behavior of children was monitored after they were switched to a diet free of foods that might cause a reaction (dyes, wheat, egg, chocolate, and others) and then challenged with those foods. Most—but not all—of those studies in the National Institutes of Health (NIH) convened a "consensus development conference" on diets and hyperactivity to review the early scientific research and advise health professionals and the public. That NIH panel concluded that food additives and certain foods do, indeed, affect a small proportion of children with behavioral problems. In addition to noting that anecdotal reports claimed "dramatic improvements" in some hyperactive children, the panel concluded that controlled studies "did indicate a limited

positive association between defined [Feingold-type] diets and a decrease in hyperactivity." It pointed out that a major limitation of the research was that most studies tested the effect only of dyes and not of other additives and foods that also might promote hyperactivity. It recognized "that initiation of a trial of dietary treatment may be warranted" for hyperactive children.

Psychological

Psychological factors such as parental stress, role dissatisfaction, perceived control, & expectations may influence the display of ADHD related symptoms. It has been observed that parents of children with ADHD report higher levels of psychological distress than the parents of children without ADHD (Murphy & Barkley, 1996). In comparison to parents of controls, parents of children with ADHD (i.e. combined or/inattentive subtype) were more dissatisfied with their roles as parents. However dissatisfaction in parenting roles may differ between mothers & fathers of children with ADHD. For example mother's dissatisfaction was associated with their children's inattention and oppositional behavior, whereas father's dissatisfaction was associated with their children's aggressive & oppositional behaviors. Hyperactivity did not contribute to role distress or dissatisfaction among mothers and fathers.

Parent's perceived control of their children's behavior has been found to be related to parental stress & symptom severity among ADHD children (Harrison & Sofronoff, 2002).Research has suggested that the severity of children's behavioral problems and mother's perceived control over their children's behavior are predicators of maternal stress. (Hudspeth & Pribram,1990) hypothesized that mother's who report high level of stress related to caring for their children may experience learned helplessness, a belief that they cannot modify or control children's behavior.

Psychosocial

Some studies have suggested that the severity of ADHD is associated with family stressor and other psychological variables (Rutler, Cox, Tupling & et al. 1975). Various adversity indicators (i.e severe marital discord, low social class, large family size, parental criminality, and maternal mental discord), Biederman, Faraone and Monuteaux, 2002) found that the risk of ADHD increased as the number of adversity factors increased. (Pressman & Colleagues, 2006) in a study of families with two children diagnosed with ADHD conclude, that there are strong links between impairment in children with ADHD and family environment. In interpreting these results it is important to keep in mind that same genetic influences, that cause ADHD may also be associated with these psychosocial factors.

The World Health Organization (WHO) states that the diagnosis of ADHD can represent family dysfunction or inadequacies in the educational system rather than individual psychopathology (David & Sternberg, 1998; Joseph, 2001).Other researchers believe that relationships with caregivers have a profound effect on attentional and self-regulatory abilities.

Pathophysiology

Research on children with ADHD has shown a general reduction of brain volume, but with a proportionally greater reduction in the volume of the left-sided prefrontal cortex. These findings suggest that the core ADHD features of inattention, hyperactivity, and impulsivity may reflect frontal lobe dysfunction, but other brain regions particularly the cerebellum has also been implicated (James, Matlin & Jerry, 1997). A review of published studies involving neuroimaging, neuropsychological genetics, and neurochemistry found converging lines of evidence to suggest that four connected frontostriatal regions play a role in the pathophysiology of ADHD: The lateral prefrontal cortex, dorsal anterior cingulate cortex, and caudate, (Kadren, Joseph & Davis,

2005). In one study a delay in development of certain brain structures by an average of three years occurred in ADHD elementary school aged patients. The delay was most prominent in the frontal cortex and temporal lobe, which are believed to be responsible for the ability to control and focus thinking. In contrast, the motor cortex in the ADHD patients was seen to mature faster than normal, suggesting that both slower development of behavioral control and advanced motor development might be required for the fidgetiness that characterizes ADHD (Sandburg, Lee & Davis, 1999). It should be noted that stimulant medication itself may affect growth factors of the central nervous system (King, Joshi & Adam, 1994). A study suggest that it is not the dopamine transporter levels that indicate ADHD, but the brain's ability to produce neurotransmitters like dopamine itself. The study was done by injecting 20 ADHD subjects and 25 control subjects with a radiotracer that attaches itself to dopamine transporters. The study found that it was not the transporter levels that indicated ADHD, but the dopamine itself. ADHD subjects showed lower levels of dopamine (hypodopaminergia) across the board. They speculated that since ADHD subjects had lower levels of dopamine to begin with, the number of transporters in the brain was not the telling factor. In support of this notion, plasma homovanillic acid, an index of dopamine levels, was found to be inversely related not only to childhood ADHD symptoms in adult psychiatric patients, but to "childhood learning problems" in healthy subjects as well (Sarah, James & Adams, 2003). One interpretation of dopamine pathway tracers is that the biochemical "reward" mechanism works for those with ADHD only when the task performed is inherently motivating; low levels of dopamine raise the threshold at which someone can maintain focus on a task which is otherwise boring (Laurce & Jenifer, 1993). Neuroimaging studies also found that neurotransmitters level (e.g. dopamine and serotonin) in the synaptic cleft goes down during depression (Herinch & Dorsall, 2007).

Management

Methods of treatment often involve some combination of behavior modification, life-style changes, counseling, and medication. A study found that medical management and behavioral treatment is the most effective ADHD management strategy, followed by medication alone, and then behavioral treatment (Walter, Cohen & Lurry, 2004). While medication has been shown to improve behavior when taken over the short term, they have not been shown to alter long term outcomes (Golan, Sahar, Pillar, 2004). Medications have at least some effect in about 80% of people (Hirshshowtiz & Max, 2004).

Prognosis

Children diagnosed with ADHD have significant difficulties in adolescence, regardless of treatment (Planzicka, 2007). Researchers suggest that 37 percent of those with ADHD do not get a high school diploma even though many of them will receive special education services (Calribi, Heins, Ronald, 1995). ADHD review says the combined outcomes of the expulsion and dropout rates indicate that almost half of all ADHD students never finish high school (Russell, Jakson & Gill, 1997) and less than 5 percent of individuals with ADHD get a college degree (Dough, Peterson & Dana, 2007) compared to 28 percent of the general population(Greenhill, Posner & vaugh, 2007). Those with ADHD as children are at increased risk of a number of adverse life outcomes once they become teenagers. These include a greater risk of auto crashes, injury and higher medical expenses, earlier sexual activity, and teen pregnancy(King, Griffin & Houdges, 2007).The proportion of children meeting the diagnostic criteria for ADHD drops by about 50 percent over three years after the diagnosis. This occurs regardless of the treatments used and also occurs in untreated children with ADHD (Cohles, White & Jenieffer, 2005). ADHD persists into adulthood in about 30 to 50 percent of cases (Rowland, Owen & Jessica, 2004). Those affected are likely to develop coping mechanisms as they mature, thus compensating for their previous ADHD.

Prevalence

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most commonly referred problems to child guidance clinics in the United States with as one third to one half of all clinic referred children displaying ADHD symptoms either alone /in combination with other disorders (Barkley, 1990). Estimated vary widely from as low as 1 per cent to as high as 20 per cent of all school age children. The best current estimate is that ADHD affects about 3 per cent to 5 per cent of all school age children as many as 2 million or more children in North American. An average of one child in every classroom requires help for this problem (APA, 1994; Szatmari, 1999). McArdle et al. (1995) found that, at a symptomatic level, hyperactivity proved common in both 7-8 years old and 11-12 year old children. The rate of 26.7 per cent prevalence found among 11-12 year old. But, the rate of hyperactivity among younger population of 7-8 year old was found to be 18.3 per cent. Leung et al. (1996) reported that the prevalence of ADHD in school boys. The sample included 3069 school boys they were screened by questionnaire and 611 were identified as ADHD children. Prevalence rates for hyperkinetic disorder, ADD and ADHD were 0.78 per cent, 6.1 per cent and 8.9 per cent, respectively. Pineda et al. (1999) studied prevalence of ADHD in 4 to 17 year old, 540 Pre-school and school children living in Manizales Colombia. The prevalence rate was 19.8 per cent in boys and 12.3 per cent in girls. Guardiola et al. (2000) investigated ADHD prevalence in first grade 484 children with DSM IV criteria. The prevalence of ADHD was 18 per cent among the children and it was higher among older children. Benjasuwantep (2004) examined the prevalence of ADHD among 1st to 6th grade students in Bangkok. The prevalence of ADHD in primary school students was 6.5 per cent. The ratio of male to female was 1:1.09. Cuftectoal (2005) assessed the prevalence and correlates of ADHD symptoms in the National Health Interview Survey (NHIS). NHIS included 10,367 children aged 4 to 17. Prevalence of clinically significant ADHD symptoms was 4.19 per cent (males) and 1.77 per cent

(females). Abdelaul (2006) estimated ADHD among primary school children comprising of 112 boys and 33 girls. They found that ADHD was a common problem among 25 per cent school children and they had poor performance in the school compared to normal children. Bener et al. (2006) conducted a study on prevalence of ADHD among primary school children in an Arabian society. A total of 2000 primary school students, aged 6 to 12 were selected and 1541 students had given consent to participate in study. The data revealed that 112 boys (14.1%) and 33 girls (4.4%) scored above the cut off for ADHD symptoms, thus prevalence rate was 9.4 per cent in the children. Abiodum et al. (2007) adjudged the prevalence of ADHD in a sample of 112 primary school children aged 7-12 year in Nigeria. The prevalence of ADHD was 8.7 per cent. The prevalence of the subtypes was predominantly inattentive 4.9 per cent, predominantly hyperactive/impulsive 1.2 per cent and combined 2.6 per cent. The male to female ratio was 2:1 for all the subtypes of ADHD accept hyperactive/impulsive, which was 3:2. Eghochukur et al. (2007) investigated the prevalence of ADHD among pupils of 9 primary schools in Nigeria. The sample included 94 (23.15%) ADHD children between 5 to 12 year and with mean age of 9.13 year of which 45 (47.87%) had the hyperactivity type, 20 (21.28%) had the inattention type and 29 (30.83%) had ADHD combined type. The result confirmed that pupils in primary schools suffer more from ADHD hyperactivity type than inattention and the combined type.

In India Mukhopadhyay et al. (2003) stated that the ADHD is one of most commonly diagnosed behaviour disorder of childhood. The sample included 238 children referred, among them 37 were diagnosed as ADHD. The prevalence of ADHD in pediatric clinic was 15.5 per cent but the inattention subtype was predominant.

Academic Achievement and ADHD

Academic performance has become an index of child's future in this highly competitive world. Academic achievement has been one of the most important goals of the educational process. It is also a major goal, which every individual is expected to perform in all cultures. Academic achievement is a key mechanism through which children learn about their talents, abilities and competencies which are an important part of developing career aspirations (Lent et al., 2000) academic achievement and career aspirations in childhood are often correlated (Abu-Hilal, 2000).

The literature shows that school-aged children with ADHD experience an abundance of academic and educational problems (Biederman et al., 1996; Barry et al. 2002; Loe & Feldman, 2007). Compared with controls, ADHD children are more likely to use remedial academic services and be placed in special education classes (Biederman et al., 1996) and experience behavioral problems that lead to suspension or expulsion (LeFever et al., 2002). The literature also demonstrates that children with ADHD are likely to show significant academic underachievement; in a review, Loe and Feldman (2007) found that ADHD is associated with poor grades, poor reading and mathematics standardized test scores, and an increased likelihood of repeating a school year. Barry and colleagues (2002) found that ADHD children obtained significantly lower scores than controls in all academic subjects. Kaufmann and Nuerk (2008) investigated specific aspects of academic difficulties experienced by ADHD individuals by looking at various components of mathematical processing. There were no differences between the ADHD-diagnosed and control groups on explicitly trained simple and complex calculation skills, but the ADHD group did perform significantly worse on basic number processing abilities such as comparing the magnitude of single digit numbers. In this study the two groups did not differ on working memory and executive functioning tasks, therefore the authors conclude that ADHD individuals could have specific deficits in magnitude comparisons.

There are a growing number of studies that look at the relationship between childhood ADHD symptoms and academic performance in community-based samples. Merrell and Tymms (2001) found that children who exhibited symptoms of ADHD performed significantly worse than those who did not on Key Stage 1 tests of reading and mathematics. Similarly, Diamantopoulou and colleagues (2007) found that, in a community sample, children's ADHD symptoms were correlated with poor school performance. In a large-scale study of ADHD symptoms in the general population (n= 13087), Rodriguez and colleagues (2007) established significant negative associations between core symptoms and reading, writing and mathematics; with a more pronounced relationship for inattentive symptoms.

The academic performance of adolescents with ADHD has faced less empirical scrutiny than the performance of their younger counterparts, but research suggests that adolescents with ADHD are also likely to struggle at school (Barkley et al. 1990; Biederman (1998). Bauermeister and colleagues (2005) found that children and adolescents with ADHD (aged between 4 and 17) were likely to have educational problems; these individuals were more likely to receive counseling or special education, and have a history of suspension or expulsion. In a meta-analysis, Frazier and colleagues (2007) found that adolescents with ADHD displayed significantly lower levels of academic achievement compared with controls.

While direct relationship studies with adolescent samples are few and far between, evidence for adolescent academic impairment has also come from longitudinal studies that follow ADHD individuals from a young age through to adolescence and even adulthood. As mentioned previously, McGee and colleagues (1991) found that 15-year-old adolescents who were rated hyperactive as pre-schoolers displayed poorer reading ability than controls, and were more likely to be reading-disabled than controls. Mannuzza and colleagues (1993) found that at adult follow-up, men who were diagnosed with

ADHD as children had completed on average 2.5 years less schooling than controls, and nearly one quarter of the ADHD group did not complete high school, compared with 2% of controls. Childhood hyperactivity has been shown to predict adolescent behavioral problems (such as CD, juvenile delinquency and substance use), and adolescent academic problems, which tend to culminate in leaving school with no qualifications (McGee et al., 2002).

Research has identified numerous difficulties in parent- child relationship in families of children with ADHD. Researchers have found that families with more stressful and conflicting environment, aggressive disciplinary practices and dysfunctional interactions in comparison to families of children without ADHD. When interacting with their children, parents of children with ADHD are less responsive & more over reactive (Barkley, Fischer, Smallish & et al. 2002). With interaction difficulties being more pronounced during structured task conditions (Woodward, Taylor & Downey, 1998). Researchers report that parents of children with ADHD are most likely to use harsh discipline, show low level of parental support (Khamis, 2006) use more negative control strategies, & engage in poor quality of scaffolding during problem solving tasks (Winsler,1998). One factor that may help explain the variability in academic outcomes in children with ADHD is the presence vs. absence of executive functioning deficits (EFDs). Executive functions (EFs) can be thought of as the decision-making and planning processes that help to control and direct our behavior. For example, when a child has a long-term assignment to complete, the executive functioning tasks involved would include dividing the task into sub-task, making a plan for completing those tasks, and monitoring performance along the way. Although no single list of EFs is universally agreed upon, most experts would agree that important EFs include such abilities as planning, reasoning, working memory (i.e., holding information in memory for later use), inhibiting behavior that may bring immediate rewards in pursuit of a long-term goal, some aspects of attention, and shifting cognitive sets, i.e, flexibility in thinking.

These EF skills are believed to be critically important for complex human behavior because they serve to organize and guide behavior in flexible and adaptive ways. A number of studies have demonstrated that children with ADHD exhibit EFDs relative to children without the disorder. In fact, current conceptualizations of ADHD emphasize that EFDs may represent the core deficits associated with ADHD, and that symptoms used to define the disorder - inattention and hyperactivity-impulsivity - are the result in many instances of these core EFDs. Despite the important role that EFDs play in current theorizing about ADHD, very little is known about the clinical implications of EFDs in children and adolescents with ADHD. For example, there has been little research on whether EFDs and core ADHD symptoms contribute independently to academic difficulties as well as the other problems that many children/teens with ADHD experience. In fact, one distinct possibility is that in the absence of EFDs, children with ADHD may not experience the severe academic struggles that are regularly associated with the disorder.

If this were found to be true, then routinely assessing children with ADHD for EFDs could alert parents and clinicians to when academic problems are especially likely to develop. This knowledge could enable them to make extra efforts to prevent this from occurring. It is also possible that ADHD with and without EFDs is associated with different outcomes in other important emotional and behavioral domains and this could also have important implications for treatment planning.

A recent meta-analysis on the academic outcomes of children, adolescents, college students, and adults with clinical diagnoses of ADHD indicates that ADHD is associated with significantly lower overall levels of achievement relative to controls (Frazier et al., 2007). These impairments have been found across reading, writing and mathematical domains (Currie & Stabile, 2006; Hinshaw, 1992; Corneldi, 2007; Resta & Eliot, 1994; Rodriguez et al., 2007), even in the absence of co morbid learning disabilities, other types

of psychopathology, level of parental education, and lower family income (Lahey et al., 1998; Pastura, Mattos, & Araajo, 2009). Children with ADHD are more likely to be placed in special education classes, repeated grades and receive academic tutoring compared to non-ADHD children (Faraone et al., 1993), with the probability of grade repetition increasing by up to 6% for children with severe symptoms (Currie & Stabile, 2006). Specifically, children who are diagnosed with the inattentive ADHD subtype tend to perform more poorly on academic measures, such as reading, math and spelling scores over time, when compared to other ADHD subtypes and controls (Massetti et al., 2008). Research studies have shown that non shared factors may include poor school performance, difficult temperament-inflated self-esteem, impulsivity, low verbal intelligence and biological events such as prenatal insult and head trauma. While shared include family, peer and neighborhood risk factors may play a significant role in the development of oppositional defiant disorder and conduct disorder, they may play a lesser role in the cause of ADHD.

Multiple Intelligences and ADHD

Gardner (1999) argued that certain intelligences were valued in the schools while others were not. Gardner (1983) claims that intelligence is comprised of multiple modules or types, which are largely independent and functionally separate from each other. To briefly describe these intelligences (Barnard & Olivarez, 2007). Linguistic intelligence generally refers to sensitivity to spoken and written language, the ability to learn languages, and the capacity to use language to accomplish certain goals. Bodily, kinaesthetic intelligence involves the potential to use one's whole body or parts of the body. Musical intelligence is self-explanatory and consists of skill in the performance, composition and appreciation of music. Intrapersonal intelligence consists of the capacity to understand oneself, to appreciate one's feelings, fears and motivations. Logical–mathematical intelligence entails the capacity to analyze problems logically, carry out mathematical operations and investigate

issues. Interpersonal intelligence entails the capacity to understand the intentions, motivations and desires of other people. Spatial intelligence refers to the potential to recognize and use patterns. Naturalistic intelligence refers to the capacity to recognize, categorize and draw upon certain features of the environment. Alcock and Ryan (2000) state that ADHD could be thought of as a gift despite its negative reputation, they suggest that teachers should attempt to identify the unique ADHD characteristics of each child and tailor their instructions & teachings behaviors to emphasize the child's strengths and abilities.

Out of these eight multiple intelligences, Gardner (1999) proposed that linguistic and logical-mathematical intelligences are the "coin of the realm", having traditionally dominated intelligence testing and are the ones that have typically been valued in school. Recognizing that children have different strengths and providing activities to accommodate those strengths while bridging to the weaker areas is at the heart of diversified instruction based on multiple intelligences theory (Barnard & Olivarez, 2007). Children are not merely receivers of the given information; they should be encouraged to construct meaning for themselves. Since, teachers should move from the role of dispensers of knowledge into the role of facilitators of learning (Gullatt, 2008). Therefore during assessment procedure, intelligence types, creativity, problem solving and wisdom should be taken into consideration. As Gullatt (2008) indicates, scientists have found that most thought occurs on a level well below conscious control and awareness that involves processing of a continual stream of sensory information; abstract thought is represented through metaphors that are associated with physical experiences and emotions; physical sensation and emotions are integral to thought and learning. Thus without sensation and emotion logic may not be possible for some researchers. It is supported that the arts may be used as a means of making meaning of what is learned as well as to synthesize what had been thought in schools (Gullatt 2008; Eisner, 1998; Aprill, 2001), arts subjects are great potential partners in academic learning,

arts have impact upon numerous social and cognitive dimensions across many academic disciplines (Gouzouasis et al., 2007). It is explained that there is a relationship between spatial and logical mathematical intelligences, as Gullatt (2008) indicates, as well as a strong relationship between spatial and musical intelligences, besides the literature. It is emphasized that a) in order to make literature meaningful, students must be given aesthetic opportunities; their comprehension of text was increased and motivation for reading was enhanced; b) the more intelligences students were required to use for learning, the deeper their understanding of the content presented. Schirduan (2001) found that children with ADHD are successful in situations in which their unique learning patterns and strengths were identified. Specifically, Schirduan examined 87 students (Grades 2-8) from schools using a multiple intelligence theory (SUMIT). In these schools, the curricula were designed to reflect dominant culture, rather than addressing individual children's learning styles, intelligences and interests. When considering Gardner's (1993) eight intelligences. Schirduan found that most schools focus on logical – mathematical and linguistic domains at the expense of other areas. This focus places students whose primary areas of intelligence lie in one or some of the other six domains at a disadvantage. Schirduan found the most of the children in the program had average self concepts as well as average achievement levels. Because academic under achievement is a valid concern for most children with ADHD (Barkley,1998) the result from this study were encouraging when taught in settings that implement a multiple intelligence approach, children with ADHD perform and feel better than children with ADHD in traditional school settings (Schirduan, 2001).

Relationship between Academic achievement and MI among ADHD children:

A Study conducted by (Rosenthal 1998,) found positive relationship in MI and ADHD student's self-esteem. Dobbs (2002), studied the relationship

between multiple intelligence-based learning environment and academic achievements, found positive relationship between MI and ADHD students' performance level in subjects such as reading, writing, and mathematics. To investigate the effects of ADHD on writing, Fahim, Nejad, and Ansari (2006) investigated whether the type of feedback that learners receive during the process of writing can have any significant effect on their short and/or long term writing achievement. The results proved the existence of the effect.

Marefat (2007) tried to see whether there is any relationship between ADHD students' MI Profile and their writing product. The instrument she used was McKenzi (1999)'s MI Inventory The results turned out that kinesthetic, existential, and interpersonal intelligences are making the greatest contribution toward predicting writing scores. As Swarlis (2008) reports, some researchers have found a negative relationship between spatial intelligence and academic success in science and mathematics among ADHD students. Akbari and Hosseini (2008) investigated the possible relationship between learners' MI scores and logical learning strategies. The result of the study showed that there is a relatively weak but statistically significant relationship between learners' MI and logical learning strategies in ADHD children. Sharifi (2008) tried to figure out the relationship between MI scores and related school subjects in attention deficit hyperactivity disorder children. He used multi-sided intelligence questionnaire adapted from Douglas and Harms´ questionnaires. According to his research, there is significant correlation among different kinds of intelligence and related school subject scores. Based on Mahdavi's (2008) research, the scores gained from ADHD learners' on TOEFL and IELTS listening proficiency tests, negatively correlate with all the eight intelligences. The researcher argues that linguistic intelligence makes a statistically significant contribution to performance in both IELTS and TOEFL listening tests this may be due the presence of learning disability among ADHD children. Jalilian (2009), pointed to the role of spatial ability in ADHD learners' performance in cloze tests. He concluded that a relationship exists

between spatial ability and the scores obtained from the administration of two forms of close tests. Another research project conducted by Hashemi (2009) aimed to see if there is any relationship between linguistic Intelligence and writing performance among ADHD learners at different proficiency levels. He reported that there is a positive relationship between linguistic intelligence and writing performance at different levels of proficiency. Snyder (2000) sought to determine the relationship between learning styles and academic achievement of high school students. The results of the study suggested that the majority of high school students were Tactile/Kinaesthetic and Global learners. The researcher concluded that an awareness of how students learn is in fact indispensable to successful classroom.

BEHAVIORAL CHARACTERISTICS AND ADHD:

Behavioral problem is defined by Verma (1980) as the deviation from the accepted pattern of behavior on the part of the child, when he/she is exposed to inconsistent social/cultural environment. Such child is not equated with presence of psychiatric illness. It is the symptom only or reaction to emotional and disturbance/ environmental stress. Social experiences with family (home), school and immediate neighborhood have a strong influence on behavior of children and behavioral problem of children. Children develop two types of behavioral problems such as externalizing and internalizing. Internalizing behavioral problems include depression, withdrawal, fear, anxiety and obsession. Externalizing behavioral problems include conduct problem, juvenile delinquency, antisocial behavior, hostile/aggression and impulsive behavior. Attention Deficit Hyperactivity Disorder (ADHD) is considered as one of the external behavioral problems. About 10% of children fall into that category where their disruptive behaviour - including hitting, kicking, and swearing - frequently gets them expelled from kinder garden or school (Clusky, Andrea, & James, 1991). The research suggests, however, those children with internalizing (e.g., depressed mood, anxiety, avoidance of others) and

externalizing (oppositional, defiant, aggressive, hyperactive) symptomatology has trouble establishing close communicative relationships that foster acceptance and understanding. For example, previous research has demonstrated that teachers find ADHD children with internalizing symptomatology less interpersonally attractive (Mullins, Chaney, Kiser, Nielsen, & Pace, 1998). Furthermore, it appears that teachers may perceive externalizing children both in a more rejecting manner and as less interpersonally attractive (Pace, Mullins, Beesley, Hill, & Carson, 1999). Mullins and colleagues (1995) suggested that the relationship between student self-reported symptomatology and negative social responding might increase over the course of the academic year. This evidence may further complicate identification of those students who may be in need of help.

Furthermore, socially aversive interpersonal experiences may foster emotional behavioral and social problems for attention deficit children (Henricsson & Rydell, 2004). ADHD Children that display internalizing symptomatology may be depressed and overlooked in a classroom setting, especially if they are quiet or withdrawn. Children that display disruptive, acting-out behaviors are often removed from the classroom and, as such, tend to receive little support from educators (Little & Hudson, 1998; Nelson, 2000). According to recent research, the rate of major depressive disorders in children is higher than previously recognized (Campbell, 1998; Harrington, 1993). There are no definitive studies of the prevalence of depression in children (Achenbach & Edelbrock, 1981; Clarizio, 1994; Schwartz, et al., 1998). However, current studies suggest that 2%- 5% of children in the general population and from 10%-50% of children in clinical populations meet the DSM-IV criteria for depressive disorder (Schwartz, Merikangas, & Kesseler, 1998). While recent studies have increased the understanding of childhood depression, their focus has largely been on cognitive and neurobiological factors without examining the interpersonal context of depression. This assumes to a large extent that the child's depression is somehow independent of

their environment and is a limitation of the DSM approach to diagnosis (Rehm & Sharp, 1996). According to Rehm & Sharp (1996), depression in children should be viewed in the context of family, peers, and school. This interpersonal context of depression may affect the onset of depression, the personal subjective experience of depression, and the behavioral manifestations and resolution of depression (Joiner & Coyne, 1999).

Depression, ADHD, and conduct disorder have all been associated with low academic aptitude in prior research (Hinshaw, 1992); academic aptitude is one determinant of school performance. Independent of aptitude, emotional and behavioral problems may affect academic performance through their associations with related academic skills such as work habits, concentration, and teacher expectations (Roeser et al., 1998). Poor work habits and trouble with concentration are defining features of attention deficit/hyperactivity disorder, one form of emotional and behavioral problems. Recently, Duncan et al. (2007) have documented the longitudinal association of children's attention problems at school entry with academic achievement at the end of primary school, based on data from six studies. In these studies, children's attention problems were correlated with externalizing and internalizing problems and all three types of problems predicted subsequent academic achievement. However, regression-adjusted estimates singled out attention as the only unique predictor, when the correlations among the three types of problems were taken into account (Duncan et al., 2007).

In Pejak et al. (2009), study correlations between students' social behaviors and their academic achievement were higher in boys and higher between socially desired behavior and academic achievement compared to socially undesired behavior. In the category of desired behavior, self management/compliance and academic behavior were significant predictors of male and female students' academic achievement. The strongest predictor of students' academic achievement was their academic behavior.

The difficulties of children with emotional and behavioral problems have in school extended beyond their academic progress into other domains of school experience. Regardless of their academic skills, children with emotional and behavioral problems may also experience negative relations with teachers that diminish their attachment to school and their motivation to succeed. Children who fail to display their behaviors or who display other emotional problems receive negative feedback from teachers (Murray & Murray, 2004) which in turn, discourages their achievement. They also experience high levels of rejection from peers and feel less attached to their schools (Patterson & Capaldi, 1990). These other school-related experiences of troubled children are likely to be implicated in their disrupted educational attainment.

EMOTIONAL CHARACTERISTIS AND ADHD

Researchers believe that Children with ADHD may have emotional problems that are an integral component of their ADHD. According to Weiner (1979) emotions are either related directly to the outcome of an event or related to the attributions ascribed to an event. Ainsworth's (1978) explored and investigated the process of regulating and expressing one's emotions (Goldberg, 2000). "Emotion regulation consists of the extrinsic and intrinsic processes for monitoring, evaluating and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (Thompson as cited in Goldberg, 2000).

In efficiently inhibitory processes in the brain are the bases of these emotional difficulties (Barkley, 2001). This is analogous to the role of inhibitory failure in the causation of other aspects of the condition (Barkley, Nigg, 2006). The emotional problems are due to failure of inhibitory mechanisms to suppress certain thoughts and feelings, in the same way that the impulsivity is due to their failure suppress instantaneous reactions & the poor concentration is due to their failure to suppress extraneous stimuli (Sergant, 2005). According to Barkley (2005) those with ADHD, at times do not give

themselves time to evaluate their emotions objectively before a reaction, fail to separate their feelings from fact. Being able to internalize our emotions, evaluate them, and analyze them before displaying them publicly assist in self control and is difficult for those suffering from ADHD (Barkley, 2005). Those who suffer from ADHD develop a pattern of social rejection due to inappropriate interactions beginning during formalized schooling according to Barkley (2005). According to Nixon (2001), those children are suffering from ADHD lack significant social skills that affect the quality of their interactions, such as; verbal & physical aggression, disruptive attempts to enter new groups, negative classroom behaviors, being quick tempered and violating the rules. Nixon (2001) presents more evidence that social cognition is clearly affected and children with ADHD can have great difficulty in making clear interpretations of their environmental interactions with others. These variables clearly lead to inhibited social contact, and a dysfunction in psycho-social development. According to Eric Erickson in Berger (2001), he clearly indicates that formalized school age children from 7 to 11 years old need to develop confidence that allow them to feel as if they have mastered "Industry" (Berger, 2001). If this stage is not mastered, they may feel inferior (Berger, 2001). Research has consistently shown the powerful contribution that parenting styles can make to produce and overcome problems related to ADHD (Barkley, 2005). The significant relationship between the quality of the parent-child relationship in the first months of life, the quality of attachment at one year of age, school performance, levels of anxiety, sociability and even general health of children in primary and secondary school has been documented (Őngel, 2006). The behavioral characteristics of ADHD have been associated with family and parenting environments, for example family instability, the mother's use of general dissatisfaction and criticism, the father's hypercritical and destructive attitude, parental distress, parents who use aggressive behaviour, mothers who are critical of their difficult babies during infancy, a lack of affection towards infants, intense parenting styles, conflicting and

negative parental behaviour specifically directed at the children and disrupted parent-child relationships (Őngel, 2006).

Research found that children with ADHD who have a secure attachment could develop a variety of competencies (such as self-/emotion regulation skills) with which children with ADHD usually have difficulties (Clarke et al., 2002). In a study, (Andreou, Agapitou & Karapetsas 2005) found that children with ADHD displayed poor verbal skills in comparison with control groups. Research has also found that children with ADHD struggle to understand emotion in language and that they struggle to read a scenario through a person's body language (Barkley, 2005).

Recognition of emotional expressions, as the main component of nonverbal processing ability, is critical to effective social interactions (Williams, 2006). Adolescents and children with ADHD have impaired social and emotional capabilities and have difficulties appraising others' emotional states (Corbett, Glidden, 2000; & Faraone, 1998). A study done by (Cadesky, Mota, & Schachar, 2000) showed that children with ADHD made more mistakes in recognizing emotions, although their errors seemed to be random compared to children with conduct problems, which shows no bias in their emotional misrecognition. They stated that children with ADHD had deficits in encoding rather than specific bias in emotion interpretation (Cadesky, Mota & Schachar, 2000). Another study showed that children with ADHD had more difficulties in recognizing emotions, especially anger expression compared with normal population (Singh, Ellis & Winton, 1998). In normal population, negative facial expressions compared to neutral ones attract attention preferentially and elicit enhanced event related potential (ERP) activity as early as 80-100ms (Anderson & Phelps, 2001). From an evolutionary viewpoint, this preference is essential to detect potential dangers in our environment (Ohman, Lundqvist, & Esteves, 2001). ADHD children in comparison with healthy individuals are significantly less accurate in identifying emotional expressions, especially

negative (fear, anger, sadness) expressions (Vuilleumier, Schwartz, Eger & et al., 2003). This deficit seems to be related to their failure to attend to emotional cues due to impaired encoding of such signals. This is in line with cognitive-behavioral theories which propose that children with ADHD have impairments in selective attention and inhibition of irrelevant information (Pelc, Kornreich, Foisy, & Dan, 2006). Most studies conducted on emotion recognition in children with ADHD have focused on behavioral measures such as visual probe reaction time (RT) studies. Second, these measures can only provide a snapshot of attention allocation at one point of time, and cannot detect sustained attention. The eye tracking methodology is probably the most direct way to assess selective attention which records the eye directions (Eizenman, Grupp, Ellenbogen , & Gemar , et al., 2003).

Relationship between behavioral characteristics and emotional characteristics among ADHD children:

Emotion is the ongoing process of responding to one's environment that is both socially acceptable and context-appropriate for a given situation (Cole, Michel, & Teti, 1994). Displays of emotion are judged by traditional social norms that guide affective display, as well as by the particular context surrounding the display. It follows, then, that emotion dysregulation may result from either lack of knowledge regarding affective display rules or difficulty modulating emotional reaction in response to social rules or context demands (Cole, Michel, & et al., 1994).

In many studies of emotion regulation, the construct is considered from a temperamental perspective and measured by global ratings of one's general emotional disposition. For example, (Sanson, Smart, Prior, & Oberklaid, 1993) found that hyperactive children were rated temperamentally difficult (e.g., socially inflexible, poor attention and concentration, emotionally intense).

Similarly, Shields and Cicchetti (2001) measured emotion dysregulation via global ratings of personality characteristics such as reactivity, empathy, arousal, and mood liability and found correlations with disruptive behavior.

Direct behavioral measures have been used to study emotion regulation as well. Cole, Zahn, Waxler, and et al. (1994) found that preschool children who were ineffective at regulating emotion during a disappointment task were more likely to be rated at-risk for future behavior problems. Hinshaw and Melnick (1995) directly observed emotional reactivity and regulation in boys with ADHD during an unsolvable puzzle task designed to elicit frustration. Boys with ADHD were grouped by high- or low-aggression status, and their emotional display and regulation strategies were coded during the puzzle task. Relative to low-aggressive ADHD and normal comparison boys, boys with ADHD in the high-aggressive group were rated as significantly more emotionally reactive and less effective at emotion regulation. In these investigations, emotional reactivity and dysregulation were not significantly related among low-aggressive boys with ADHD, suggesting it may be aggression and not symptoms of ADHD per se that account for this emotional responding. However, in both studies, the high- and low-aggressive groupings were derived according to former diagnostic criteria (*Diagnostic and Statistical Manual of Mental Disorder* [3rd ed., rev. {*DSM–III–R*}], American Psychiatric Association, 1987), which did not differentiate hyperactive–impulsive and inattentive symptoms (i.e., any 8 of 14 symptoms from the criteria set). As such, the low-aggressive ADHD group in these studies may not have presented the same impulsivity problems as the high-aggressive group and possibly better fit the profile of the Predominantly Inattentive subtype described in the current taxonomy (i.e., *Diagnostic and Statistical Manual of Mental Disorders* [4th ed. {*DSM–IV*}], American Psychiatric Association, 1994). In support of this possibility, Maedgen and Carlson (2000) used a procedure comparing children's emotional reactions to both a disappointing and a non disappointing event and found that children with ADHD–C were rated more intense and less

effective at emotion regulation than controls based on global ratings of overall reaction to disappointment. Children with ADHD–I did not differ significantly from either ADHD–C or control children on these global emotion- regulation ratings. When event-coded data were analyzed, there was a non significant trend for children with ADHD–C to display more frequent negative expression of emotion (e.g., a frown or grimace) during the disappointment condition compared to both ADHD–I and non-ADHD children.

STATEMENT OF THE PROBLEM- *A Study of ADHD Children In Relation To Their Cognitive and Affective Variables*

PURPOSE OF THE STUDY:

From the above detailed discussion it is clear that ADHD is the most prevalent mental disorder of childhood which severely affects the School Children in two social settings. i.e. school & home environment, yielding serious impairments in academic attainment, intellectual development, problem behavior, emotional control, peer relations, and parent child-relationship. Therefore, the investigator is interested to examine the cognitive and affective variables of ADHD children with the hope that it will help the parents as well as teachers to understand their problems and will provide guideline to teachers, and child care centers, in dealing with such type of children. The purpose of this study is also to divert the attention of researchers towards the need and importance to understand the problems faced by ADHD children. It may also help in formulating the intervention strategies for ADHD children at large.

OBJECTIVES OF THE STUDY:

The main objectives of the study will be as follows:-

- To identify children with Attention Deficit Hyperactivity Disorder (ADHD).

- To study Cognitive variables (academic performance and multiple intelligence) of ADHD children and children without ADHD.
- To study Affective variables (behavioral and emotional characteristic) of children with ADHD and children without ADHD.

HYPOTHESES:

On the basis of above mentioned objectives the following hypotheses have been formulated for verification and confirmation.

$H_{1:}$ There will be significant difference in academic achievement of children with ADHD and children without ADHD.

$H_{2:}$ There will be significant difference in multiple intelligences of children with ADHD and children without ADHD.

$H_{3:}$ There will be significant difference in behavioral characteristic of children with ADHD and children without ADHD.

$H_{4:}$ There will be significant difference in emotional characteristic of children with ADHD and children without ADHD.

A literature review is a description of the literature relevant to a particular field or topic. It gives an overview of what has been said, who the key writers are, what are the prevailing theories and hypotheses, what questions are being asked, and what methods and methodologies are appropriate and useful (Cooper, 1988).

Academic achievement and ADHD:

ADHD is a disorder with symptoms of inattention, hyperactivity and impulsivity that can affect both daily life and school performance in school aged children. ADHD is likely to interfere with the application of skills and the efficient test taking strategies. The behavior subtypes of ADHD do not exhibit the specific skill deficit on neuropsychological functioning but these children have severe academic under performance along with inattention, impulsivity and over activity (August et al., 1989).

Agarwal (1965) conducted a study on reading ability in ADHD children in relation to certain cognitive and non-cognitive factors. A sample of 400 ADHD students and 300 non–ADHD students of X grade were taken. The subjects completed a battery of reading ability tests, general intelligence and non-verbal intelligence tests, the results indicated that ADHD children showed lower reading ability and academic achievement than non- ADHD children.

Agnisky (1967) examined whether children with ADHD, with and without working memory (WM) deficits, differ in their academic achievement and clinical profiles. 73 children (26% female), aged 6-12 years, with ADHD completed standardized achievement tests of reading, mathematics, and written language on Six WM measures and executive functioning were administered. On the sample, only 26% met the criteria for a WM deficit. Children with WM impairments were found to perform significantly worse than those without WM

impairment on all achievement clusters, with no clinical profile differences. Poor WM is not universal in ADHD, but its presence is associated with lower academic achievement scores.

Akpan, Ojinnaka and Ekanum (1969) conducted a study to compare the academic performance of school children with behavioural disorders & with that of their controls Total of 132 school children aged 6-12 years with behavioural disorders participated and academic performance was assessed by grades obtained on two semesters. Results showed that, while 26.5% and 12.9% pupils with behavioural disorders had high and poor academic performance respectively, 38.6% and 9.1% pupils without such disorders had high and poor performances respectively. The difference in the overall academic performance was statistically significant. The mean scores of the pupils with behavioural disorders on four core subjects compared well with those of the controls.

Andrew, Sarah and Shelly (1973) assessed intellectual ability, inattention, academic achievement, and attention in 45 children (ages 7—15) diagnosed with ADHD. Hierarchical regressions were performed with selective, sustained, and attentional control domains of the *Test of Everyday Attention for Children* as predictor variables and with performance on the *Wechsler Individual Achievement Test* as dependent variables. It was hypothesized that sustained attention and attentional control would predict performance on achievement tests. Results demonstrate that attentional control accounted for a significant amount of variance in all academic areas (reading, math, and spelling), even after accounting for verbal IQ and parent-reported inattention. Sustained attention predicted variance only in math, whereas selective attention did not account for variance in any achievement domain.

Braumeister, et al. (1975) found that children and adolescents with ADHD (aged between 4 and 17) were likely to have educational problems; these individuals were more likely to receive counseling or special education, and have a history of suspension or expulsion.

Biedeman et al. (1979) studied the association between executive function deficits (EFDs) and functional outcomes among children and adolescents with attention-deficit/hyperactivity disorder (ADHD). Participants were children and adolescents with ADHD (n = 259) and without ADHD (n = 222). The researcher defined EFD as at least 2 executive function measures impaired. Significantly more children and adolescents with ADHD had EFDs than did control participants. ADHD with EFDs was associated with an increased risk for grade retention and a decrease in academic achievement relative to (a) ADHD alone, (b) controlled socioeconomic status, (c) learning disabilities, and (d) IQ. No differences were noted in social functioning or psychiatric comorbidity. Children and adolescents with ADHD and EFDs were found to be at high risk for significant impairments in academic functioning.

Cynthia, Susan and Monica (1980) conducted a study to examine differences specific to academic and executive function deficits in a sample of 40 children, aged 9–15 years. Although there was a tendency for the Predominantly Inattentive (PI) group to evidence lower performance on calculation and written expression tasks, for executive function domains of set shifting, interference, inhibition, and planning, differences emerged for interference, the results revealed that expected differences were found on the Inhibit scale with the Combined Type (CT) group evidencing greater problems in this area.

Greta, Mestti and Benjamin (1983) assessed Academic performance seven times over 8 years in 125 children who met symptom criteria for ADHD at 12-18 years of age and in 130 demographically-matched non-referred comparison children. When intelligence and other confounds were controlled, children who met modified criteria for the predominantly inattentive subtype of ADHD had lower reading, spelling, and mathematics scores over time than both comparison children and children who met modified criteria for the other subtypes of ADHD. In some analyses, children who met modified criteria for the combined type had somewhat lower mathematics scores than comparison

children. The robust academic deficits relative to intelligence in the inattentive group in this age range suggest either that inattention results in academic underachievement or that some children in the inattentive group have learning disabilities that cause secondary symptoms of inattention. Unexpectedly, internalizing (anxiety and depression) symptoms independently predicted deficits in academic achievement controlling ADHD, intelligence, and other predictors.

Heiligenstein et al. (1985) compared a small number of students who were classified as having ADHD (n= 26) with non-ADHD students (n= 28). They found that the ADHD group had lower grade averages and were more likely to be on academic probation. Students with ADHD encounter problems with tasks and processes that are synonymous with the requirements of education, such as study strategies, note taking, summarizing and outlining, test taking, test strategies, time management, concentration, motivation, information processing and self-testing.

Hussein and Omayma (1990) revealed that significant failure of academic achievement in ADHD pupils as compared with normal controls. Participants include N=30 children, between 6 to 12 years of age. (n=16) boys and (n=14) girls, Whereas 87.5%, who showed poor scholastic achievement (percentage of those with low grade) had ADHD, while only 14.3 %of those who had excellent level had ADHD (one child out of total seven children).IQ level of ADHD children in the present study showed no significant difference from controls but perceptual reasoning showed a significant difference in ADHD children as compared with controls that might have a negative effect on the scholastic achievement. Therefore deficits in intellectual functioning in ADHD children are best accounted for by the multiple subtests grading and implications of Stanford Binnet rather than a total IQ level. The studied ADHD children in the present study also showed significant poor cognitive

skills. Cognitive difficulties would also explain the associated impaired academic performance.

Joseph, Larry and Stephen (1993) conducted a study in which N=89 girls participated, 43 girls with ADHD & 36 without ADHD Of age 6 to 17 years. Girls with ADHD were significantly more impaired on estimated IQ than comparison girls despite being matched on other demographic variables. Relative to comparison girls, the girls with ADHD were also significantly more impaired on the Freedom from Distractibility subtests of the WISC-R and on arithmetic and reading achievement scores. Although their mean performance on executive function tests was generally poorer than that of control girls, there were no statistically significant differences on these measures.

Mayes, Susan and Calhon (1998) examined Learning, attention, graphomotor, and processing speed scores were analyzed in N= 149 typical control children and N= 886 clinical children with normal intelligence. Non-significant differences were found between control children and children with anxiety, depression, and oppositional-defiant disorder. Control children performed better than children with ADHD. Children with ADHD had greater learning problems. Attention, graphomotor, and speed weaknesses were likely to coexist, the majority of children with autism and ADHD had weaknesses in all three areas, and these scores contributed significantly to the prediction of academic achievement.

McGe et al. (2003) conducted a study on schooler's who were rated as hyperactive (a key symptom of ADHD) through to adolescence, and found that they had poorer reading ability than controls at ages 7 and 9. By age 15 the hyperactive children were still behind the controls in reading performance, and there were significantly more reading-disabled individuals in the hyperactive group compared with controls.

Waugh et al. (2005) determined that the proportion of children who were assessed by their teachers as exceptionally inattentive, hyperactive or impulsive in the classroom. The relationships between these traits, achievement and progress were examined. The participants comprised N= 4148 children. Reading and mathematics achievement of the participants was assessed at the start and end of the reception year, and in year 2. Behavior was assessed at the end of reception using a rating scale for ADHD. The proportion of children with exceptional scores on the behavior rating scale was reported. The reading and mathematics attainment and value-added of children with high scores on the behaviour rating scale were found to be educationally and statistically significantly lower than children with zero scores. The results revealed that achievement of children with high scores on the behaviour rating scale replicated previous studies which investigated the achievement of children with ADHD.

Rabiner et al. (2006) studied ADHD symptoms and reading achievement in 387 school children. They found that inattention and hyperactivity was negatively associated with reading achievement, with the strongest correlations appearing with inattention. Moreover they found that school inattention was associated with poor long-term reading achievement; this was studied up to 5 years after baseline, where 34% of inattentive schooler's were reading-impaired.

Richard et al. (2008) compared 24 students (20 males and 4 females) with ADHD and 20 students (15 males and 5 females) with attention-deficit disorder without hyperactivity (ADD/noH) referred to diagnostic clinic for comprehensive neuropsychological assessment. The students ranged in age from 6 years 0 months to 12 years 10 months. This study found that math achievement test scores for students with ADD/noH were significantly lower than those for students with ADHD. It is hypothesized that inattention

interferes with students' ability to master abstract symbol systems, especially in the acquisition of basic arithmetic skills in the primary grades.

Tammy and Barry (2010) examined a group of children with ADHD (n=113) (with average intellectual abilities) performed significantly below prediction in reading, writing, and mathematics skills and demonstrated a greater discrepancy between actual and predicted achievement than did a group of non-ADHD children (n=115). Even when controlling for performance on a measure of executive functioning, severity of ADHD symptoms, based on parent report, significantly predicted academic underachievement in reading, writing, and mathematics. These results indicate that the more severe the behavioural symptomatology of children with ADHD is, the more negatively impacted their school performance may be.

Multiple intelligence and ADHD

Faraone et al. (1967) conducted a study on intellectual performance and school failure in children with ADHD. The sample consisted of 140 children with ADHD and 120 normal as control. The result revealed that ADHD children were more likely to have had linguistic disabilities and repeated grade. They had been placed in special classes and received academic tutoring.

Mealer et al. (1970) examined the difference in patterns of cognitive functioning, as assessed by the Wechsler intelligence scale for children third revision and wide range assessment of memory and learning (WRAML) in 20 boys with ADHD referred for other psychological problems. The results revealed that ADHD boys showed significantly lower scores on the WISC-III and WRAML Greengage memory index, learning index and visual memory index. ADHD boys had special problems on tasks requiring attention and processing through initial stage of memory.

Aman & et al. (1972) conducted a longitudinal study on intelligence and ADHD. The sample included 26 ADHD children. Four year study revealed that children identified with both low intelligence and ADHD appear to have significant behavioural and emotional problems in their early adolescence and also important qualitative difference in the outcomes of children identified as ADHD and normal IQ.

Benjasuwantep et al. (1979) assessed total sample 353 children from 1st – 8th grade. Progressive test was used to test intellectual functioning. They found that ADHD students had lower score on intellectual than the group without ADHD and also children with ADHD are at risk for academic and behaviour problems.

Schewean (1982) conducted a study on performance of ADHD children in different tasks musical, naturalistic and spatial-visual intelligences. The sample included 43 diagnosed ADHD children between the age of 7 and 13 years. The results revealed that ADHD children scored lower on these tests because they failed to develop logical relationships in spatial-visual subtest, secondly on musical & naturalistic intelligence such children are not able to understand the finesse of aesthetic sense used in performance of tasks.

Kashala et al. (1985) conducted a study on 28 ADHD and 157 normal children age ranged 11 to 16. They found only minor difference between ADHD and normal subjects in most of activities. ADHD children perform more poorly on tests of motor skills and had more violation of rules on the planning tests.

Manassis et al. (1987) studied a sample of 21 ADHD children age 8-12 years. The results revealed that ADHD children showed significant impairment in their working memory and academic functioning than compared to normal children. In general, studies show that relative to controls ADHD children evidenced poor performance, more subtests variability, more variable

performance discrepancies and greater cognitive deficiencies on measurements of intelligence.

Dhall and Thukral (1988) conducted a study on ADHD children of 7th class the no. of participants were 100. He studied the reading achievement scores and learning disability among them. The results revealed ADHD children scored lower on reading test because of the linguistic or speech problems present in them.

Tillman et al. **(1992)** conducted a study aimed to specify the deficit in intellectual ability in children with attention deficit hyperactivity disorder (ADHD), by studying the mediating role of impairments in central executive function (EF)-related components (working memory, inhibition, sustained attention) and non-EFs (short-term memory and processing speed). 281 children aged 8–11 years from a population-based sample were assigned to either the ADHD group, the clinical comparison group, or the normal comparison group. The results showed that children with ADHD had poorer fluid and crystallized intelligence, relative to both comparison groups. Further, regarding fluid intelligence, these deficits were not fully mediated by, but rather went beyond, poorer functioning on the studied EF-related components and non-EFs. We tentatively interpret these fluid deficits in children with ADHD as representing deficiencies in a general intellectual resource reflecting executive attentional processes. Concerning crystallized ability, in contrast, the deficit signified impairment in the studied cognitive functions, as indicated by the significant full mediation effect.

Mullane & et al. (1995) evaluated the alerting, orienting, and executive attention abilities of children with ADHD and their typically developing (TD) peers using a modified version of the adult attention network test .Total of 25 children with ADHD, Combined Type (ADHD-C, mean age = 9.20 years), 20 children with ADHD, Predominantly Inattentive Type (ADHD-I, mean age = 9.58 years), and 45 TD children (mean age = 9.41 years) matched on age and

intelligence to the ADHD group completed the ANT-I. Results revealed children with ADHD (n = 45) displayed significantly weaker alerting and executive attention than TD children (n = 45) but did not differ from TD children in orienting ability. Children with ADHD-C (n = 25) did not differ from children with ADHD-I (n = 20) on any of the three networks.

Cheon et al. (1998) Conducted a study on N=197 ADHD children these children were grouped according to their intelligence level. They were compared by the Personality Inventory for Children (PIC), Conners' Continuous Performance Test (CPT), and Wisconsin Card Sorting Test (WCST). There were significant differences in PIC, on the subscales of verbal development, socialization and autism. In the CPT, there was no significant difference. In the WCST, there were significant differences in the total number of errors, the number of preservative errors, the number of completed categories and the number of trials needed to complete the first category. Considering these results, the intelligence level of ADHD children is related to their disabilities and behavioural symptoms. Executive functions such as abstract thinking, categorization, logical-mathematical, working memory and flexibility had significant relationship to the intelligence levels of ADHD children. Therefore, the intelligence level of children with ADHD influences the higher executive functions of regulating attention and information processing rather than attentional functions and capacity alone.

Mashall et al (1999). Conducted a test on ADHD children to study their logical-mathematical intelligence. He administrated Kaufmann test of intelligence. The results revealed that ADHD children scored lower on subtests of intelligence. Further the results revealed that ADHD children failed to develop logical relationship while performing the test.

Wendy & et al. (2001) conducted a study subjects were N= 43 girls, aged 6 to 17 years, with DSM-III-R ADHD and n=36 comparison girls without ADHD. Girls with ADHD were significantly more impaired on estimated IQ than

comparison girls despite being matched on other demographic variables. Relative to comparison girls, the girls with ADHD were also significantly more impaired on the Freedom from Distractibility subtests of the WISC-R and on arithmetic and reading achievement scores. Although their mean performance on executive function tests was generally poorer than that of control girls, there were no statistically significant differences on these measures. Girls with ADHD have impairments in some tests of attention and achievement. However, neuropsychological performance on tests of executive function was less impaired than that previously documented in boys with ADHD. If confirmed in a larger sample, these findings suggest that girls with ADHD may be less vulnerable to executive function deficits than boys.

Bracken and McCallum (2003) conducted a study on non- verbal intelligence test (UNIT) as to how children with ADHD would perform on the (UNIT). Students between the age of 5-17 years were taken the results revealed that the students scored lower on the memory quotient than on the reasoning quotient, however lower scores were obtained on successive processing and planning tasks than on simultaneous tasks.

Andreou, Agapitou and Karapetar (2005) examined whether ADHD children exhibit low verbal IQ (VIQ) and distinguishable test profile on the Verbal comprehension (VC) and Freedom from distractibility (FFD) factors, and whether gender influences their verbal abilities., WISC-III verbal scales were administered to N=69 ADHD children (n=50 boys and n=19 girls) and controls who were matched for age and sex. Mean scores for all WISC-III verbal scales, VIQ, VC and FFD of ADHD children were significantly lower than controls. FFD was found lower than VC and it correlated statistically significantly with VC in ADHD children. No gender differences were found among ADHD children.

Liu et al. (2008) in their study investigated intelligence structure of different attention-deficit/hyperactivity disorder (ADHD) subtypes, to explore the cognitive deficit mechanism of children with different ADHD subtypes. Predominantly inattentive subtype of ADHD (ADHD-PI; n=60), hyperactive/impulsive subtype of ADHD (ADHD-HI; n =60) and combined subtype of ADHD (ADHD-C n=60) randomly, the normal control group (n=100) were selected from school, Wechsler Intelligence Scale for Children (WISC) were adopted. All children completed all part tests, analysis verbal intelligence quotient (VIQ), personal intelligence quotient (PIQ) functional intelligence quotient (FIQ) among different groups. The results revealed that FIQ of the ADHD group is lower than normal groups(P0.01),The CV of ADHD groups IQ scores is bigger than normal, The un-balance between VIQ and PIQ incidence rate of ADHD was higher than normal, ADHD-PI got higher VIQ scores than ADHD-HI and ADHD-C(P0.01),ADHD-HI got higher PIQ scores than ADHD-PI(P0.01),but did not differ from ADHD-C, the FIQ of ADHD-C was lower than the mix of two other subtypes. Conclusions: Children with ADHD having intelligence deficit is an impersonal fact. Three subtypes of ADHD have difference on degree and structure of cognitive function impairment; suggest that cognitive mechanism maybe different between ADHD-HI and ADHD-PI.

Demaree, and Youngstrom (2012) conducted a meta-analysis of existing literature to determine the magnitude of differences between ADHD and normal control participants according to several factors, including estimates of intellectual functioning. They found 123 studies in which intellectual functioning was estimated. These studies (n = 47) utilized complete measures of intellectual functioning, Results showed that ADHD groups displayed significantly lower estimated full scale intelligence scores when compared to controls.

Behavioural characteristics and ADHD:

Mariellen, Fischer and Barkley (1959) reported that the behavioural ratings received by a large sample of hyperactive children meeting diagnostic criteria (n=108) and a community control sample of normal children (n=61) were followed prospectively over 8 years into adolescence. On some parent report measures both groups declined in the severity of their behaviour problems across time, while on other measures only the hyperactive group declined, but the hyper actives always remained more deviant than the controls at follow-up. The hyper actives and controls also differed on most teacher and self report ratings at follow-up. The greatest degree of agreement between raters at adolescence was between parent and youth ratings. These results are consistent with previous research demonstrating more deviant scores for hyperactive children than controls on various rating scales at adolescent follow-up. They also are consistent with research showing significant longitudinal continuity of both internalizing and externalizing behavioural pathology.

Charlotte and Eric (1962) in their study examined parent-child interactions and parent characteristics in families of non-problem children and attention deficit hyperactivity disorder (ADHD) children with lower (ADHD-LOD) and higher (ADHD-HOD) levels of oppositional-defiant behaviour. Families of ADHD children were recruited from a parent training program. Observed and parent-reported child behaviour problems were highest in the ADHD-HOD group. Observed parent behaviour revealed few differences, but daily reports indicated that parents in both ADHD groups used more negative-reactive and fewer positive parenting strategies than control parents. Maternal psychological functioning differed between the ADHD and non-problem groups, but not between the two ADHD groups. Fathers of ADHD-HOD children reported more psychological disturbance than controls. Parenting self-esteem was lowest in the ADHD-HOD group and highest in the non problem group. The results support the LOD and HOD distinction, but also suggest that, although certain difficulties are more common in the families of ADHD-

HOD children, families of ADHD-LOD children also differ from controls on a number of dimensions.

Gabrielle et al. (1967) studied ADHD and depression, children with ADHD and depression, and children without ADHD, all derived from a large community sample. High levels of comorbid depression are found in children with ADHD. Children with ADHD and depression are more depressed and anxious than their non-depressed ADHD counterparts but do not have more extreme levels of ADHD or aggression. The association between depression and ADHD does not appear to be epiphenomenal, that is, related to a shared association with anxiety or externalizing symptoms. Finally, children with ADHD and depression display more impairment in social and academic functioning compared to controls. Although social impairment is greater in children with ADHD and depression than in children with only ADHD, conduct problems are not.

Kara, Tanyal and John (1980) studied a sample of 94 children (58 with ADHD, 36 normal controls) between 11 and 15 years old participated Young children with ADHD exhibited more problem behaviour and were less socially adjusted and have low level self understanding than their normal counterparts according to behaviour ratings. Children with ADHD exhibited more noncompliant and inappropriate behaviour than normal controls, particularly during task situations. Parents of children with ADHD were more likely to display negative behaviour toward their children. Children with ADHD exhibited more negative social behaviour in school settings and scored significantly lower on a test of intrapersonal understanding..

Mary, Crag and Kathrayn (1981) studied differences between 37 aggressive and 37 nonaggressive children with attention deficit hyperactivity disorder (ADHD) were evaluated. Aggressive ADHD children differed little from nonaggressive ADHD children except that nonaggressive displayed more problems with inattentiveness at school than aggressive while mothers of

aggressive reported more symptoms of psychopathology in themselves than mothers of nonaggressive. In their drug responding, aggressive and nonaggressive were quite similar. The few exceptions were on measures of conduct, on which the aggressive were initially rated as more extreme and subsequently showed the greater degree of improvement from medication than nonaggressive. Results replicated those of a previous study and further indicate that aggressive and nonaggressive ADHD children share a common disorder of ADHD but aggressive have more impaired family situations.

Dieter, Herbert and Johan (1991) conducted a study on 221 attention deficit hyperactivity disorder (ADHD) [123 (4.5%) predominantly inattentive (IA), 47 (1.7%) predominantly hyperactive/impulsive (HI), and 51 (1.9%) combined type (C)].Subjects were compared to 221 controls on teacher ratings of behavioural, withdrawn, and social functioning. The results revealed relatively independent areas of impairment for each group. The IA children were impaired in all areas, but were rated as displaying more appropriate behaviour and fewer externalizing problems than HI or C children. The HI group displayed externalizing and social problems and symptoms of withdrawn, but was rated as no different as controls in learning or internalizing problems. The C group demonstrated severe and pervasive difficulties across domains which means ADHD children with behavioral problems have trouble in establishing close communicative relationships that foster acceptance and understanding that is the reason they face social problems and remain withdrawn from social situations.

David and Angela (2001) examined the temperament of children diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD). The results demonstrated that parents and teachers rate the temperament of children classified as ADHD and normal children differently. In addition, parents and teachers tended to be consistent in their ratings of children classified as ADHD, children with ADHD appear to display similar patterns of

temperament at home and at school. Parents and teachers both reported that children classified as ADHD tended to display temperaments with high activity levels, high distractibility, and low persistence, which is consistent with the ADHD diagnostic criteria.

Denis et al. (2003). Examined the association of disruptive behavior/risky behavior with adaptive and social functioning in children with ADHD and without ADHD the sample included 207 children (144boys and 63 girls) & 61 control children between the ages 7-17 years. The results revealed that children with ADHD were rated significantly above unaffected controls on the indices of disruptive behavior. Hierarchal regression analysis revealed that aggression and delinquency added unique contribution to impairment in social and adaptive functioning and becomes a part of daily activities erupting into fits of anger & even lash out physically which show that they are more prone to aggression.

Michael et al. (2006) examined rule-breaking behavior as a mediator of the relation between ADHD symptoms and disciplinary actions 1 year later after-school care. The sample included 147 school-age children. Results revealed that total ADHD symptoms positively predicted rule-breaking behavior at 1-year follow-up, which in turn was positively associated with disciplinary actions. Further, it revealed hyperactive/impulsive symptoms were a positive predictor of rule-breaking behavior, and rule-breaking behavior mediated this link between hyperactive/impulsive symptoms and disciplinary actions.

Marmorstein (2009). This study examined the relationships between anxiety and externalizing disorders among ADHD children of ages 9 -17. Results indicated that all externalizing disorders (attention-deficit hyperactivity disorder, oppositional defiant disorder, and conduct disorder) were positively related to anxiety disorders. The magnitude of these associations tended to be stronger for males than for females (particularly for associations between social phobia and all externalizing disorders) and at younger, compared to

older, ages (particularly for the association between oppositional defiant disorder and overanxious disorder).

Andrade et al. (2011). This study examined social information processing (SIP) of events with varied outcomes in children with ADHD and conduct problems (CPs; defined as oppositional defiant disorder [ODD] or conduct disorder [CD]) and controls. Participants were 64 children (46 boys, 18 girls) aged 6 to 12, including 39 with ADHD and 25 controls. Vignettes were developed that systematically varied with regard to peer intention (ambiguous, negative, positive) and event outcome (ambiguous, negative, positive), and were used to evaluate participants' SIP abilities (cue encoding, interpretation, and response generation). Results showed that, after controlling for CPs, children with ADHD detected fewer positive, negative, and neutral cues; attributed more negative and less positive intent to peers; focused less on situational outcomes of vignettes; and generated fewer positive responses compared with the control group. These results indicate that children with ADHD differ from non-ADHD children, even after controlling for CPs, in how they process positive and negative social experiences

Dustin et al. (2012). This study examined the interaction between children's perceptions of their social acceptance and their peer-rated social standing in predicting emotional and behavioral problems. A sample of 213 children was studied. Results revealed that, lower peer-rated social standing was associated with higher levels of antisocial behavior, academic problems, and hyperactivity/inattention. On the other hand, higher self-perceived social acceptance was associated with increased levels of peer-rated fighting at school. For children who were rated as having high social standing among their peers, poorer self-perceived social acceptance was associated with increased oppositional behaviors and conduct problems at home. In addition, children who reported lower self-perceived social acceptance exhibited

increased levels of depressive symptoms, even when they were relatively well liked by their peers.

Emotional characteristics and ADHD.

Karen, Andrea and Chronis (1962) examined emotion regulation as a mediator in the relationship between ADHD and depressive symptoms in children. Moreover, effortful control was examined as a mediator in the relationship between ADHD and emotion regulation. Participants included 69 children between the ages of 10 and 14 with (n = 37) and without (n = 32) DSM-IV ADHD. Results demonstrated significant differences between children with and without ADHD on depressive symptoms and emotion regulation ability, but not effortful control. Furthermore, emotion regulation fully mediated the relationship between ADHD and depressive symptoms.

David et al. (1964) studied 27 children & adolescents with ADHD were compared to age matched typically developing controls for investigating emotion processing in children with ADHD by assessing not only emotion recognition. But also, emotion on the basis of contextual cues. Findings of this study show that emotion processing difficulties in children with ADHD extend beyond facial emotion & also affect the recognition of emotions on the basis of contextual information. Thus indicates that children with ADHD have an overall emotion processing deficit.

Brown and Corrina (1967) studied concerns social skills, emotion regulation, & emotion socialization, three groups concerning 90 children aged 9-13(ADHD-I), (ADHD-C) & non- ADHD diagnosed boys and girls. indicated that both ADHD groups displayed social knowledge and performance deficits, and that impairment in these areas cannot be distinguished between the subtypes as readily as when they are compared to non-ADHD children. Consistent with prior research describing the behavioural profile of ADHD-I children, a pattern of emotional withdrawal and distraction was identified for

this group, while children with ADHD-C reported a preference for expressing their feelings of anger more openly to their mothers. Both ADHD groups were less likely to express feelings to friends. Lastly, all ADHD children perceived their mothers to punish their expressions of emotion, including joy, more so than non-ADHD children.

Kitchens, Rosens and Braaten (1971) studied differences in anger, aggression, depression & anxiety between ADHD and non-ADHD participants were 29 children with ADHD-C and 30 children without ADHD of age 6-12 years. In order to evaluate the emotional experiences of children with ADHD. They reported themselves to be significantly angrier than non-ADHD children and to also be significantly more depressed. Differences between children with and without ADHD on these measures were not extremely large, but clearly indicate that, on average, children with ADHD experience greater levels of anger and depressive feelings. No significant differences were found in the amount of anxiety that children in each group reported. Parents and teachers also reported that children with ADHD appeared more depressed than other children. Teachers, but not parents, also observed the children with ADHD to display more symptoms of anxiety.

Peris and Baker (1975) examined whether pupils with hyperactivity differ from their peers in their perception of facially and vocally expressed emotions. There were 60 participants of the research – 30 pupils with ADHD aged 8-9 and control group. The obtained data show the existence of essential differences in the level of correct perception of mimic emotion signals between hyperactive children and control group. The responses from children with ADHD were less precise, especially when concerning the mimics. The most correctly perceived were facial and vocal signals of joy and sorrow, although the children with ADHD had the smallest problem with the recognition of positive emotions. This should be taken into consideration when planning the therapy – rewards, emotions and positive reinforcement seem to

be better received by hyperactive children and can function as directions regulating behaviour better

Subhashni et al. (1978) in their study tested fifty children and adolescents for their ability to recognize the 6 basic facial expressions of emotion. Subjects were presented with sets of 6 photographs of faces, each portraying a different basic emotion, and stories portraying those emotions were read to them. After each story, the subject was asked to point to the photograph in the set that depicted the emotion described. Overall, the children correctly identified the emotions on 74% of the presentations. The highest level of accuracy in recognition was for happiness, followed by sadness, with fear being the emotional expression that was mistaken most often. When compared to studies of children in the general population, children with ADHD have deficits in their ability to accurately recognize facial expressions of emotion. These findings have important implications for the remediation of social skill deficits commonly seen in children with ADHD.

Christy, Walcott and Steven (1978) examined group differences of 49 boys aged 6 to 14 years with and without attention deficit hyperactivity disorder (ADHD) in emotion regulation during frustrating peer competition. Half of all boys in each group were explicitly instructed to hide their feelings if they became upset during the competition. Behavioural inhibition, both before and after the competitive task, was examined using the Stop Signal Task (SST), and emotion regulation was assessed via structured observation data. Effect sizes indicated that impulsive ADHD boys displayed greater disinhibition and were less effective at emotion regulation than comparison boys. In addition, boys with ADHD were unsuccessful in masking their emotions even when instructed to do so. In contrast, comparison boys were more successful at emotion regulation when given instruction to self-regulate, and these regulatory attempts predicted later inhibitory control.

Jensen and Rosen (1985) reported that the mothers of children with and without ADHD between the ages of 6 and 15 were asked to rate their child's emotional response. Children with ADHD were rated as significantly more emotionally reactive to both immediate and future events as were children without ADHD. Differences at both the immediate and future time periods were stronger in response to negative as opposed to positive emotional events. In response to the consequences of their behaviour, however, children with ADHD were rated as less emotionally reactive than children without ADHD.

Karnes and Rubeal (1992) studied the relationship between negative emotion and Attention Deficit-Hyperactivity Disorder (ADHD) among school children. Gender differences in the self-reporting of negative emotion among children with ADHD were examined. Sixty-four students (39 male, 25 female), with a diagnosis of ADHD, and 109 students (37 male, 72 female) who were evaluated yet received no ADHD diagnosis, completed self-report measures of negative emotion. Results suggest that regardless of gender, students with an ADHD, Combined Type diagnosis reported significantly more negative emotion compared to students with no diagnosis.

Sidney, Sydney and Jancie (1991) investigated the emotional and social characteristics of boys who had co-occurring giftedness and AD/HD as compared with boys with only 1 of the 2 exceptionalities. The participants were 3 boys with AD/HD and giftedness and 6 comparison boys with only 1 of the 2 exceptionalities. Findings suggested that participants with co-occurring giftedness and AD/HD had difficulties regulating their emotions, problems with peer relationships, and stressed families. Giftedness appeared to exacerbate the social/emotional difficulties associated with AD/HD rather than serve a protective function. The findings suggested that AD/HD is a risk factor for psychosocial adjustment difficulties in young boys who are intellectually gifted.

Braaten and Rosen (2000) conducted a study to understand empathy and emotional functioning in children with ADHD. They hypothesized that lower level of empathy could significantly contribute to behavioural symptoms displayed by children with ADHD. Participants included 24 boys with ADHD & 19 comparison boys of age 6 to 12. The results of this study suggest that boys with ADHD are less likely than non-ADHD boys to feel badly when they observe others in difficult circumstances, and are also less likely to report that their own feelings are directly affected by what happens to others. According to their parents, ADHD boys are also more likely than non-ADHD boys to display behaviours that indicate a variety of negative emotions.

Marx et al. (2002) studied impact of emotional dysregulation on cognitive performance in subjects with ADHD. Male & Female subjects (n=39) & gender- IQ matched controls subjects (n=40) performed on emotion working task. In the background of the task, neutral and negative stimuli varied in emotional saliency (negative pictures with low saliency, negative pictures with high saliency), but subjects were instructed to ignore these pictures and to process the working memory task as quickly and as accurately as possible. Compared to control subjects, ADHD patients showed both a general working memory deficit and enhanced distractibility by emotionally salient stimuli in terms of lower performance accuracy. In particular, while controls showed impaired WM performance when presented with highly arousing negative background pictures, a comparable decrement was observed in the ADHD group already with lowly arousing pictures. Results suggest that difficulties in suppressing attention towards emotionally laden stimuli might result from deficient executive control in ADHD.

Jogsan (2004). Investigated the relationship between Emotional stability and adjustment in ADHD children. The total sample comprised 60 children out of these 30 were ADHD children and 30 were non-ADHD children. Significant

differences were detected between the ADHD group and control group on all the dimensions of Emotional stability except emotional Regression.

Pishyareh et al. (2009). Studied that children with attention deficit/ hyperactivity disorder (ADHD) react explosively and inappropriately to emotional stimuli and have some impairment in attending to emotional cues. Based on this, a visual direction of children with ADHD towards paired emotional scenes was studied. Thirty boys between the ages of 6 and 11 years diagnosed with ADHD were compared with 30 age-matched normal boys. All participants were presented paired emotional and neutral scenes in the four following categories: pleasant-neutral; pleasant-unpleasant; unpleasant-neutral; and neutral - neutral. Their visual orientations towards these pictures were evaluated using the eye tracking system. With regards to duration of first gaze, which is the time taken to fixate on a picture before moving to another picture, ADHD children spent less time on pleasant pictures compared to normal group, while they were looking at pleasant - neutral and unpleasant - pleasant pairs. The duration of first gaze on unpleasant pictures was higher while children with ADHD were looking at unpleasant - neutral pairs. Based on the findings of this study it could be concluded that children with ADHD attend to unpleasant conditions more than normal children which leads to their emotional reactivity.

Sobanski et al. (2010). Investigated the emotional liability (EL) (i.e. excessive emotional reactions) in ADHD children the sample consisted of 118 children (aged 6-18years)the results revealed that severe EL was associated with ADHD core symptoms, it was found that hyperactive-impulsive symptoms accounted for 30% EL variance and emotional problems in children.

Clikman (2012). This study evaluated the social perception and social functioning of children with Attention Deficit Hyperactivity Disorder-

Combined (ADHD-C), ADHD-predominately inattentive (ADHD-PI), and controls. Two-hundred and seventy children with ADHD-C, ADHD-PI, or controls were evaluated using direct and indirect measures of social functioning. The ADHD-C and ADHD-PI groups showed significant differences in interpretation of emotional and nonverbal cues on a direct measure of social perception compared with controls. The number of inattentive symptoms was significantly related to poor performance for interpretation of both emotional and nonverbal cues, whereas hyperactivity and impulsivity symptoms showed a less robust relation. Children with ADHD-C were rated by parents and teachers as showing significant problems with social performance and problem behaviors compared with those with ADHD-PI or with controls. These findings show a link between inattention and social perception that is separate from impulsivity difficulties.

SAMPLE:

The sample for the present study consisted of 80 children [comprising of 40 ADHD and 40 non-ADHD children] taken from various schools of district, Srinagar. The age group of the sample was 12-14 years. A detailed description of the sample is given in the following table:

Category	Gender	Frequency	Total
ADHD	Male Female	25 15	40
NON-ADHD	Male Female	25 15	40
			N=80

TOOLS USED: The following tools were administered for attaining the objectives of the present study.

i. Vanderbilt Diagnostic Rating Scale for identification of ADHD Children (Vanderbilt Diagnostic Rating Scale, 1998):

Vanderbilt diagnostic rating scale has two versions. Vanderbilt diagnostic parent rating scale VDPRS (47 items) and Vanderbilt diagnostic teacher rating scale VDTRS (35 items). VDRS includes all 18 symptoms of the DSM-IV criteria for ADHD. Likewise with the teachers' form, the parents are asked to rate the severity of each behavior on a 4- point scale (“never” to “very often”). The diagnosis is considered present if scores of 2 or 3 on a 0–3 scale (indicating that a behavior is “often” or “very often” present) are checked for the requisite number of criteria based on the DSM-IV definition of ADHD diagnosis. The range of score on inattention is from 0 to 39 and the range of score on hyperactivity/impulsivity was 0 to 45. If a student scores 20 and above on inattention or 22 on hyperactivity/impulsivity or on both 42 and

above was considered as the child having ADHD and combined type includes, 6 or more than six symptoms both on inattention and hyperactivity. The performance section of the VDPRS & VDTRS is an eight-item scale with four items relating to academic performance: (a) overall academic performance, (b) reading, (c) mathematics, and (d) written expression. Another four items evaluate relationships: (e) peers, (f) siblings, (g) parents, and (h) participation in organized activities. Parents and teacher rates each of these items on a 5-point scale from "problematic" to "above average."

ii. Child Behavior Checklist (Achenbach & Rescrola, 1991):

Child Behavior Checklist (CBCL) is a parent questionnaire that covers behavior problems of children aged 6 to 18 years. The CBCL includes dimensions i.e., Depression, withdrawn, somatic complaint, social problems, thought problems, attention problems, rule-breaking behavior, and aggressive behavior, internalizing and externalizing problems. The 113-item checklist on the CBCL asks the parents to make ratings from 0 to 2 depending on the extent to which a particular statement describes the child. CBCL has high reliability. The range of test-retest value is 0.95 to 1.00, inter-rater reliability 0.93 to 0.96; internal consistency 0.78 to 0.97.

iii. Multiple Intelligence Scale for Children [Gardner, H. (1983)]:

This test is developed for school going children of age group (8-16).This test consists of 40 items which measures seven types of mental abilities showing different types of capability & perception .i.e. Linguistic (words & language), Logical-mathematical (logic & numbers), Musical (music, sound & rhythm), Bodily-kinesthetic (body movement control), Spatial-visual(images & space), Interpersonal (others people's feelings), Intrapersonal (self-awareness) naturalistic (nature-loving). Children score their intelligences ranging from 1 to 4.

iv. Emotional Stability Test [Gupta and Singh (1985)]:

The emotional stability test for children has been developed by Gupta and Singh. This test consists of 15 items meant for school going children of age group 12-14 years. All the items are related to the emotional stability of children. In EST, each item of the test is scored as either +1 or 0. There are two types of items in the test, that is, positive and negative. All positive items which are endorsed as 'YES' and the negative items, which are endorsed by the subject as 'NO' are given score of +1. High score indicates low emotional stability and as low score indicates high emotional stability. The reliability of the test is .72 which means it is highly reliable.

v. Academic Achievement:

The annual grades of students for two previous years have been taken as academic achievement scores. The grades were converted into percentages and they are categorized as per the report cards of the students –

Category	**Percentage**
Excellent	75-100
Good	60-75
Average	50-59
Poor	49 & below

Statistical Tools

To accomplish the objectives of present study, appropriate tools were used, keeping in view the nature of the problem and sample size, the analysis of data was carried out by using Mean, Standard Deviation, and t-test.

Procedure

Firstly, the researcher went to the different schools for identification of the ADHD children. The teacher was considered as a respondent from each school to identify ADHD children by using Vanderbilt Diagnostic teacher Rating

Scale based on DSM-IV criteria for ADHD. The pupils identified by the teacher as ADHD were similarly, identified by their parents by using Vanderbilt Diagnostic parent Rating scale. Being a special population, the researcher identified 40 ADHD children from 35 schools. Control in the study was kept by adopting the following procedure. If 3 or more children were identified as ADHD from a class, the equal numbers of children with respective gender were randomly selected for non-ADHD. After the identification of both ADHD & non-ADHD children the other scales/measures/questionnaires were given to the parents. Firstly, it included Child behavior checklist developed by (Achenbach & Rescrola, 1991) which rates the different behavioral characteristics of ADHD & non-ADHD accordingly.

Then, the intelligence of children was tested by using multiple intelligence tests developed by (Gardner, H. 1983). The emotional stability was measured by using the emotional stability test developed for children by (Gupta & Singh, 1985).

Lastly, remains the academic achievement of children. The grades obtained during final examination were considered. Average of two previous year grades was taken.

This chapter is devoted to describe and discuss the results of the study. In order to meet the objectives of the present study, the analysis of data was carried out by using descriptive statistics and t-test.

Table 4.1. Distribution of symptom severity of ADHD in sample group.

ADHD Categories	Gender				N=40
	Male		Female		
	Frequency	% age	Frequency	% age	
ADHD Mild	11	57.89%	8	42.11%	n=19
ADHD Hyper	14	66.67%	7	33.33%	n=21

From the above table (4.1) it is evident that 57.89% of boys 42.11% of girls have mild ADHD whereas, 66.67% of boys and 33.3% of girls have hyper ADHD.

Table 4.2. Showing the type of ADHD present in children.

ADHD Types	Gender				N=40
	Male		Female		
	Frequency	% age	Frequency	% age	
Inattentive Type	3	21.43%	11	78.5%	n = 14
ADHD Hyperactive Impulsive Type	16	94.11%	1	5.8%	n = 17
Combined Type	6	66.67%	3	33.33%	n= 9

From the table (4.2) it is clear that 21.43% of boys have inattentive type of ADHD while 94.11% of boys have hyperactive-impulsive type of ADHD and 66.67% of boys have combined type ADHD. Whereas in girls, 78.57% have inattentive type of ADHD 5.8% have hyperactive-impulsive type of ADHD and 33.3% have combined type ADHD.

Table 4.3 Frequency distribution of Academic Achievement among ADHD children.

	Level	ADHD	
		Frequency	% age
Academic Achievement	Low	27	67.5%
	Average	11	27.5%
	High	2	5%

The above table (4.3) signifies that 67.5% of ADHD children fall in low level whereas 27.5% lie at average level and 5% fall in high level.

Table 4.4. Frequency distribution of multiple intelligences among ADHD children.

Multiple Intelligences	Level	ADHD	
		Frequency	% age
Linguistic Intelligence	Low	22	55%
	Average	16	40%
	High	2	5%
Logical- Mathematical Intelligence	Low	29	72.5%
	Average	10	25%
	High	1	2.5%
Musical Intelligence	Low	35	87.5%
	Average	5	12.5%
	High	0	0%
Bodily- Kinesthetic Intelligence	Low	22	55%
	Average	18	45%
	High	0	0%

Spatial- Visual Intelligence	Low	32	80%
	Average	7	17.5%
	High	1	2.5%
Inter-personal Intelligence	Low	30	75%
	Average	9	22.5%
	High	1	2.5%
Intra-Personal Intelligence	Low	30	75%
	Average	9	22.5%
	High	1	2.5%
Naturalistic Intelligence	Low	38	95%
	Average	2	5%
	High	0	0%

Table (4.4) presents a frequency distribution of levels of multiple intelligences in ADHD children. As it is evident from the above table that ADHD children have low level of multiple intelligences. (95%) of ADHD children have low level of Naturalistic intelligences followed by Musical intelligence (87.5%), Spatial-visual (80%), Interpersonal & Intrapersonal (75%) each. Linguistic and bodily-Kinesthetic intelligence (55%) each. Not more than (5%) of ADHD children showed high level of Linguistic intelligence, Logical-mathematical intelligence, Spatial-visual, Interpersonal & Intrapersonal intelligences. Further the table reveals that not a single ADHD child from the sample have high level of Musical, Bodily-kinesthetic, and Naturalistic intelligences.

Table: 4.5. Frequency distribution of behavioral characteristics among ADHD children.

Behavioral Characteristics	Level	ADHD	
		Frequency	% age

Depression	Low	6	15%
	Average	14	35%
	High	20	50%
Withdrawal	Low	5	12.5%
	Average	12	27.5%
	High	23	57.5%
Somatic complaint	Low	7	17.5%
	Average	10	25%
	High	23	57.5%
Social Problem	Low	5	12.5%
	Average	7	17.5%
	High	28	70%
Thought Problem	Low	6	15%
	Average	9	22%
	High	25	62.5%
Attention Problem	Low	3	7.5%
	Average	16	40%
	High	21	52.5%
Rule breaking behavior	Low	3	7.5%
	Average	11	27.5%
	High	26	65%
Aggression	Low	8	20%
	Average	9	22.5%
	High	23	57.5%
Internalizing Problem score	Low	2	5%
	Average	7	17.5%
	High	31	77.5%
Externalizing Problem score	Low	5	12.5%
	Average	10	25%

	High	25	62.5%
Total Problem Score	Low	0	0%
	Average	9	22.5%
	High	31	77.5%

Table (4.5) presents a frequency distribution of levels of behavioral characteristics in ADHD children. As it is evident from the above table that ADHD children have high level of behavioral characteristics. (77.5%) of ADHD children have high level of internalizing problem score and total problem score. Followed by social problem (70%), rule- breaking behavior (65%). Thought problem & externalizing problem (62.5%) each. Withdrawal, somatic complaint & aggression (57.5%) each. Attention problem (52.5%) & Depression (50%).

Table:4.6. Frequency distribution of Emotional Characteristics among ADHD children

	Level	ADHD	
		Frequency	% age
Emotional Characteristics	Low	25	62.5%
	Average	15	37.5%
	High	0	0%

From the above table (4.6) it is clearly evident that 62.5% of ADHD children have low emotional characteristic whereas 37.5% of them have average emotional characteristic and 0% of them have high level of emotional characteristic.

Table 4.7. Comparison of mean scores of Academic achievement in ADHD and non-ADHD children

Variable	Group	N	Mean	Std. Dev.	t-value

Academic Achievement	ADHD	40	55.45	9.94	9.17**
	Non-ADHD	40	74.50	8.54	

****P ≤ 0.01 level of significance**

The above table (4.7) indicates that there is a significant difference in the Academic achievement of ADHD and Non-ADHD Children. The obtained t-value (t=9.17) is significant at 0.01 level. Thus our hypothesis, H1: "There will be significant difference in academic achievement of children with ADHD and children without ADHD" is accepted.

Table.4.8. Comparison of mean scores of multiple intelligences (tests) between ADHD and Non-ADHD children

Multiple Intelligences	Group	N	Mean	Std. Dev.	t-value
Linguistic	ADHD	40	10.45	2.57	9.15**
	Non-ADHD	40	15.05	1.86	
Logical-Mathematical	ADHD	40	8.50	3.03	12.58**
	Non-ADHD	40	15.37	1.64	
Musical	ADHD	40	7.32	1.63	20.95**
	Non-ADHD	40	15.37	1.79	
Bodily-Kinesthetic	ADHD	40	9.05	3.10	11.27**
	Non-ADHD	40	15.27	1.60	
Spatial-Visual	ADHD	40	8.27	2.89	8.64**
	Non-ADHD	40	14.00	3.02	
Interpersonal	ADHD	40	8.25	2.41	14.29**
	Non-ADHD	40	15.02	1.77	

Intrapersonal	ADHD	40	8.32	2.78	13.50**
	Non-ADHD	40	15.25	1.66	
Naturalistic	ADHD	40	6.45	2.05	12.20**
	Non-ADHD	40	13.17	2.81	

****p≤ 0.01 level of significance**

Table (4.8) clearly depicts that there is a significant difference in Linguistic, Logical-Mathematical, Musical, Bodily-Kinesthetic, Spatial-Visual, Interpersonal, Intrapersonal and Naturalistic multiple intelligences among ADHD and Non-ADHD children. The obtained t-value (t= 9.15, 12.58, 20.95, 11.27, 8.64, 14.29, 13.50, 12.20) is significant at 0.01 level. Thus our hypothesis $H_{2:}$ "There will be significant difference in multiple intelligences of children with ADHD and children without ADHD" is accepted.

Table 4.9. Comparison of mean scores of behavior characteristics in ADHD and Non ADHD children

Behaviour Characteristics in ADHD & Non-ADHD Children	**Group**	**N**	**Mean**	**Std. Dev.**	**t-value**
Depression	ADHD	40	10.30	4.09	12.11**
	Non-ADHD	40	2.02	1.38	
Withdrawal	ADHD	40	9.55	3.14	14.35**
	Non-ADHD	40	1.82	1.29	
Somatic complaint	ADHD	40	9.05	4.27	
	Non-ADHD	40	2.35	1.231	9.51**
Social Problem	ADHD	40	9.05	4.27	
	Non-ADHD	40	2.35	1.231	13.69**
Thought Problem	ADHD	40	8.75	3.14	
	Non-ADHD	40	1.77	9.73	13.40**
Attention Problem	ADHD	40	10.20	3.64	
	Non-ADHD	40	2.00	1.08	13.63**

Rule Breaking behavior	ADHD	40	9.02	2.95	14.24**
	Non-ADHD	40	1.92	1.09	
Aggression	ADHD	40	9.57	4.52	9.23**
	Non-ADHD	40	2.45	1.83	
Internalizing Problem score	ADHD	40	27.40	8.02	14.61**
	Non-ADHD	40	7.65	2.9	
Externalizing Problem score	ADHD	40	18.05	6.04	13.50**
	Non-ADHD	40	4.22	2.32	
Total Problem score	ADHD	40	73.72	13.81	22.99**
	Non-ADHD	40	18.87	6.05	

****P≤ 0.01 level of significance**

The above table (4.9) shows that there is a significant difference among ADHD and Non-ADHD Children in Depression, Withdrawal, somatic complaint, social problem, thought problem, aggression, Rule breaking behavior, Internalizing problem, externalizing problem, and Overall behavioural problem. The obtained t-value (t=12.11, 14.35, 9.51, 13.69, 13.40, 13.63, 14.24, 9.23, 14.61, 13.50, 22.99) is significant at 0.01 level. Thus our hypothesis, $H_{3:}$ "There will be significant difference in behavioral characteristic of children with ADHD and children without ADHD" is accepted.

Table:4.10. Comparison of mean scores of children with ADHD and without ADHD on Emotional characteristics

Emotional Characteristics in ADHD & Non-ADHD Children	**Group**	**N**	**Mean**	**Std. Dev.**	**t-value**
Emotional Stability	ADHD	40	10.65	1.56	18.70**
	Non-ADHD	40	3.20	1.97	

****p≤ 0.01 level of significance**

From the above table (4.10) indicates that there exists a significant difference in Emotional Stability (emotional characteristic) in ADHD and Non-ADHD children the obtained t-value (t=18.70) is significant at 0.01 level.

Therefore, our hypothesis $H_{4:}$ "There will be significant difference in emotional characteristic of children with ADHD and children without ADHD" is accepted.

Discussion:

ADHD is considered the most prevalent disorder of childhood and has been the serious concern for most of the researchers; therefore this study gives us a glimpse of the problems faced by ADHD children. The present study results revealed that symptoms of inattention are found more in girls where as in boys hyperactive-impulsive symptoms and combined type is present. Further the results revealed that ADHD children have lower academic achievement (67.5%) of ADHD children fall in low level which is supported by the findings of Agarwal (1965) that pupil with ADHD underachieved in schools in relation to certain cognitive factors. Another study conducted by Greta, Messti & Benjamin (1983) reveal that ADHD is associated with significantly lower over all levels of achievements relative to controls. The present findings of the study are in line with the previous literature that ADHD children have lower academic achievement. With regard to the multiple intelligences, ADHD children have low multiple intelligences as compared to non-ADHD. Findings of our study indicated that ADHD children have lower levels of Naturalistic, Musical, & Spatial-Visual intelligences which is in consistent with findings of (Schewean, 1982) that ADHD children have problem with naturalistic, musical & spatial-visual intelligences because they are not able to understand the finesse of things, which relates to the ability to visualize or imagine the art or design. Further the results revealed that (72.5%) of ADHD children have low level of logical-mathematical intelligences. Mashall et al. (1999) studied that ADHD children have problems with logical–mathematical intelligences they are not able to develop logical relationships which are required in performing these tasks. Findings of Karen, Tanyal and John (1980) reveals that ADHD children have problem with self reflection, they are not able to understand what

they do and what they want which in turn develops the problem of interpersonal understanding, which is proved by our findings that (75%) of ADHD children have low level of intrapersonal & interpersonal intelligences. Further the findings reveal that (55%) of ADHD children have low level of linguistic intelligence which is supported by the results of Dhall and Thukral (1988) that majority of the ADHD children have language problems which provides a way that ADHD children have low level of linguistic intelligence. The current findings of the study are in accordance with the literature that ADHD children have low multiple intelligences.

The present study findings reveal that ADHD children face various behavior problems. Depression is found among (50%) of ADHD children. Gabrielle et al. (1967) states children who perceived themselves as less academically or socially competent were more likely to be depressed Furthermore, children who indicated a higher level of depression were having more social problem which clearly supports our results that (70%) of ADHD children have social problem. Dieter, Herbert, and Johan (1991) studied that ADHD children with behavioral problems have trouble in establishing close communicative relationships that foster acceptance and understanding that is the reason they face social problems and remain withdrawn from social situations which supports our results that (57.5%) of ADHD children remain withdrawn. Mullane et al. (1995) revealed that ADHD children are not able to have focussed attention on tasks this is due to the executive function deficit present in them. Attention deficit is the core symptom of ADHD. Therefore, the results revealed that (52.5%) of ADHD children have attention problems. Micheal et al. (2006) conducted a follow up study which revealed that hyperactivity-impulsivity is predictor of rule breaking behavior. In findings of our study majority of ADHD children (65%) have rule breaking behavior. Another study conducted by Denis et al. (2003) studied that risky behavior of ADHD children becomes a part of daily activities erupting into fits of anger & even lash out physically which show that they are more prone to aggressive

behavior. The results revealed that (57.5%) of ADHD children showed aggressive behavior. Our findings are in line with the literature that ADHD children have behavior problem.

These behavior problems give rise to emotional problems. The results of our study revealed that (62.5%) of ADHD children have low emotional control. David et al. (1964) indicated that children with ADHD made more mistakes in recognizing emotions. They stated that children with ADHD had deficits in encoding rather than specific bias in emotion interpretation. Another study conducted by Pishyareh et al. (2009) studied that ADHD children have impairment in attending emotional cues. They react inappropriately to an emotional situation that is the reason ADHD children are not able to internalize, analyze & evaluate feelings before displaying. Therefore, our findings are in accordance with the previous literature that ADHD children have low emotional control.

The present study was designed to identify ADHD children and study their relationship to cognitive (Academic achievement and multiple intelligence) and affective variables (behavioral characteristics and emotional characteristics). The sample group included 40 ADHD and 40 non-ADHD children. The whole dissertation is divided into five chapters. The first chapter of the dissertation gives a complete overview and the theoretical background of ADHD and their related variables i.e. (cognitive and affective variables) under the separate headings. This chapter discusses the theories and approaches proposed by different researchers in the light of empirical evidences; it also highlights the purpose of the present study, its objectives and hypothesis. Chapter second offers an intensive review of the related literature of the main variable i.e. ADHD and their relationship with the other variables. Chapter third of the dissertation highlights the sample chosen, method of data collection, instruments used and the statistical procedures employed. Chapter four of the present study focuses on the analysis of the data and its interpretation. This chapter includes results and a discussion section in which the findings of the present study are discussed with prior empirical support. The last chapter i.e. conclusion includes the findings, implications of the present research, its limitations and the suggestions for future research.

VALUE/ IMPLICATIONS OF THE STUDY:

This research has important implication for the better performance and adjustment of ADHD children.

i. Lower academic achievement can be improved by framing the curriculum according to their abilities. Furthermore, needs of ADHD children are taken care by arranging the special classes for them.

ii. Multiple intelligences of ADHD children can be enhanced by fostering different learning activities in school such as reading centre, science & math centre, art centre, building centre, working together centre.

iii. Behavior problems can be dealt with by setting the rewards for improving the unacceptable behavior.

iv. Emotional problems can be solved by avoiding the problem situation that will evoke the child to react inappropriately or not placing the child next to someone who knows how to agitate him. Furthermore providing a child plan for handling problem situation, encouraging the child to forgive himself for mistakes. Will help to reduce emotional tension in children.

LIMITATIONS OF THE STUDY:

i. Since the sample of the present study was small, generalizability to the larger population becomes difficult.
ii. Parents and teachers whole-heartedly did not cooperate during identification of ADHD children.
iii. Lack of attention in filling the items of questionnaire on the part of children may have some effect on responses of items.

SUGGESTIONS FOR FUTURE RESEARCH:

i. Different academic achievement domains such as study habits, reading, writing, and mathematical difficulties should be studied.
ii. Parental depression and parenting styles should be studied in future research.
iii. Subtypes of ADHD need to be studied separately.

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APPENDIX-A **ADHD Teacher Rating Scale**

INSTRUCTIONS

Below are some statements related to your student? How he/she behaves in the classroom. There are four possible alternatives – NEVER, OCCASIONALLY, OFTEN, and VERY OFTEN. Please choose the alternative which appropriately describes his/her behavior. Indicate your response by marking tick mark (√) on the cells below.

S. N0.	Statements	Never	Occasionally	Often	Very Often
1.	Fails to give attention to details or makes careless mistakes in school work.				
2.	Has difficulty sustaining attention to tasks or activities.				
3.	Does not seem to listen when spoken to directly.				
4.	Does not follow through on instructions and fails to finish schoolwork.				
5.	Have difficulty organizing tasks and activities.				
6.	Avoids, dislikes, or is reluctant to engage in tasks that require sustaining mental effort.				
7.	Loses things necessary for tasks or activities (school assignments, pencil, or books).				
8.	Is easily distracted by extraneous stimuli.				
9.	Is forgetful in daily activities.				
10.	Fidgets with hands or feet or squirm in seat.				
11.	Leaves seat in classroom or in other situations in which remaining seat is expected.				
12.	Runs about or climbs excessively in situations in which remaining seat is expected.				

APPENDIX-A **ADHD Teacher Rating Scale**

13.	Has difficulty playing or engaging in leisure activities quietly.				
14.	Is “on the go” or often acts as if “driven by a motor”.				
15.	Talks excessively.				
16.	Blurts out answers before question have been completed.				
17.	Has difficulty waiting in line.				
18.	Interrupts or intrudes on others (e.g butts into conversation or games).				
19.	Loses temper.				
20.	Actively defies or refuses to comply with adult’s requests or rules.				
21.	Is angry or resentful.				
22.	Is spiteful or vindictive.				
23.	Bullies, threatens, or intimidate others.				
24.	Initiates physical fights.				
25.	Lies to obtain goods for favors or to avoid obligations.				
26.	Is physically cruel to people.				
27.	Has stolen items of nontrivial value.				
28.	Deliberately destroys other’s property.				
29.	Is fearful, anxious, or worried.				
30.	Is self conscious or easily embarrassed?				
31.	Is afraid to try new things for fear of making mistakes.				
32.	Feels worthless or inferior.				
33.	Blames self for problems, feels guilty.				
34.	Feels lonely, unwanted, or unloved; complains that “no one				

APPENDIX-A **ADHD Teacher Rating Scale**

	loves" him or her.				
35.	Is sad, unhappy, or depressed.				

	Classroom Behavior	Problematic	Very Problematic	Average	Above Average	Normal
1.	Relationship with peers.					
2.	Following directions or rules.					
3.	Disturbing class.					
4.	Assignment completion.					
5.	Organizational skills.					

	Academic Performance	Problematic	Very Problematic	Average	Above Average	Normal
1.	Reading					
2.	Mathematics					
3.	Writing Expression					

APPENDIX-B **ADHD Parent Rating Scale**

INSTRUCTIONS

Below are some statements related to your child. How he/she behaves in the home or classroom. There are four possible alternatives – NEVER, OCCASIONALLY, OFTEN and VERY OFTEN. Please choose the alternative which appropriately describes his/her behavior. Indicate your response by marking tick mark (√) on the cells below.

S. N0.	Statements	Never	Occasionally	Often	Very Often
1.	Does not pay attention to details or makes careless mistakes, such as in homework.				
2.	Has difficulty sustaining attention to tasks or activities.				
3.	Does not seem to listen when spoken to directly.				
4.	Does not follow through on instructions and fails to finish schoolwork.				
5.	Have difficulty organizing tasks and activities.				
6.	Avoids, dislikes, or is reluctant to engage in tasks that require sustaining mental effort.				
7.	Loses things necessary for tasks or activities (school assignments, pencil, or books).				
8.	Is easily distracted by extraneous stimuli.				
9.	Is forgetful in daily activities.				
10.	Fidgets with hands or feet or squirm in seat.				
11.	Leaves seat when remaining seat is expected.				
12.	Runs about or climbs excessively in situations in which remaining seat is expected.				
13.	Has difficulty playing or engaging in leisure activities quietly.				
14.	Is “on the go” or often acts as if “driven by a motor”.				
15.	Talks too much.				

APPENDIX-B **ADHD Parent Rating Scale**

16.	Blurts out answers before question have been completed.				
17.	Has difficulty waiting his or her turn.				
18.	Interrupts or intrudes on others (e.g butts into conversation or games).				
19.	Argues with adult.				
20.	Loses temper.				
21.	Actively defies or refuses to comply with adult's requests or rules.				
22.	Deliberately annoys people.				
23.	Blames others for his or her mistakes or misbehaviors.				
24.	Is touchy or easily annoyed by others.				
25.	Is angry or resentful.				
26.	Is spiteful or vindictive.				
27.	Bullies, threatens, or intimidate others.				
28.	Initiates physical fights.				
29.	Lies to obtain goods for favors or to avoid obligations.				
30.	Is truant from school (skips school) without permission?				
31.	Is physically cruel to people.				
32.	Has stolen items of nontrivial value.				
33.	Deliberately destroys other's property.				
34.	Has used a weapon that can cause serious harm (bat, knife, brick, and gun).				
35.	Is physically cruel to animals.				
36.	Has deliberately sets fire to cause damage.				
37.	Has broken into someone else's home, business, or car.				
38.	Has stayed out at night without permission.				
39.	Has run away from home overnight.				
40.	Has forced someone into sexual activity.				
41.	Is fearful, anxious, or worried.				
42.	Is afraid to try new things for fear of making mistakes.				

APPENDIX-B **ADHD Parent Rating Scale**

43.	Feels worthless or inferior.				
44.	Blames self for problems, feels guilty.				
45.	Feels lonely, unwanted, or unloved; complains that “no one loves” him or her.				
46.	Is sad, unhappy, or depressed.				
47.	Is self-conscious or easily embarrassed?				

	Classroom Behavior	Problematic	Very Problematic	Average	Above Average	Normal
1.	Relationship with peers.					
2.	Following directions or rules.					
3.	Disturbing class.					
4.	Assignment completion.					
5.	Organizational skills.					

	Academic Performance	Problematic	Very Problematic	Average	Above Average	Normal
1.	Reading					
2.	Mathematics					
3.	Writing Expression					

APPENDIX-C **Behaviour Checklist**

INSTRUCTIONS

Below are some statements related to your child? How he/she behaves at different occasions. There are four possible alternatives – NOT TRUE, SOMEWHAT OR SOMETIMES TRUE and VERY TRUE OR OFTEN TRUE. Please choose the alternative which appropriately describes his/her behavior. Indicate your response by marking tick mark (√) on the cells below.

S. No.	Statements	Not true	Somewhat or sometimes true	Very true or often true.	
1.	Acts too young for his or her age.				
2.	Drinks alcohol without parent's approval.				Describe:_____ _____
3.	Argues a lot.				
4.	Fails to finish things he/she starts.				
5.	There is very little he she enjoys.				
6.	Bowel movements outside toilet.				
7.	Bragging, boasting.				
8.	Can't concentrate, can't pay attention for long.				
9.	Can't get his/her mind off certain thoughts; obsessions.				Describe:_____ _____
10.	Can't sit still, restless, or hyperactive.				
11.	Clings to adults or too dependent.				
12.	Complains of loneliness.				
13.	Confused or seems to be in a fog.				
14.	Cries a lot.				
15.	Cruel to animals.				
16.	Cruelty, bullying, or meanness to others.				
17.	Day dream or get lost in his/her own things.				
18.	Deliberately harms self or attempts suicide.				

APPENDIX-C **Behaviour Checklist**

19.	Demands a lot of attention.				
20.	Destroys his/her own things.				
21.	Destroys things belonging to his/her family or others.				
22.	Disobedient at home.				
23.	Disobedient at school.				
24.	Doesn't eat well.				
25.	Doesn't get along with other kids.				
26.	Doesn't seem feel guilty after misbehaving.				
27.	Easily jealous.				
28.	Breaks rules at home, school, or elsewhere.				
29.	Fears certain animals, situations, or places, other than school.				Describe:_____ _____
30.	Fears going to school.				
31.	Fears he/she might think or do something bad.				
32.	Feels he/she have to be perfect.				
33.	Feels or complaints that no one loves him/her.				
34.	Feels others are get to out him/her.				
35.	Feels worthless or inferior.				
36.	Gets hurt a lot accident-prone.				
37.	Gets in many fights.				
38.	Gets teased a lot.				
39.	Hangs around with others who get in trouble.				
40.	Hears sound or voices that aren't there.				Describe:_____ _____
41.	Impulsive or acts without thinking.				
42.	Would rather be alone than with others.				
43.	Lying or cheating.				

APPENDIX-C **Behaviour Checklist**

44.	Bites fingernails.				
45.	Nervous, high-strung, or tense.				
46.	Nervous movements or twitching.				Describe:_____ _____
47.	Nightmares.				
48.	Not liked by other kids.				
49.	Constipated, does not move bowls.				
50.	Too fearful or anxious.				
51.	Feels dizzy or lightheaded.				
52.	Feels too guilty.				
53.	Overeating.				
54.	Overtired without good reason.				
55.	Overweight.				
56.	Physical problems without know medical cause:				
a.	Aches or pains not (stomach or headaches).				
b.	Headaches.				
c.	Nausea, feel sick.				
d.	Problems with eyes (not if corrected by glasses).				Describe:_____ _____
e.	Rashes or other skin problems.				
f.	Stomachaches.				
g.	Vomiting, throwing up.				
h.	Other.				Describe:_____ _____
57.	Physically attack people.				
58.	Picks nose, skin, or other parts of body.				Describe:_____ _____
59.	Plays with own sex parts in public.				
60.	Plays with own sex parts too much.				
61.	Poor school work.				
62.	Poorly coordinated or clumsy.				
63.	Prefers being with older adults.				

APPENDIX-C **Behaviour Checklist**

64.	Prefers being with younger kids.				
65.	Refuses to talk.				
66.	Repeats certain acts over and over; compulsions.				Describe:_____ _____
67.	Runs away from home.				
68.	Screams a lot.				
69.	Secretive, keep things to self.				
70.	Sees things that aren't there.				Describe:_____ _____
71.	Self-conscious or easily embarrassed.				
72.	Sets fire.				
73.	Sexual problems.				Describe:_____ _____
74.	Showing off or clowning.				
75.	Too shy or timid.				
76.	Sleeps less than most kids.				
77.	Sleeps more than most kids during day and/or night.				Describe:_____ _____
78.	Inattentive or easily distracted.				
79.	Speech problem.				Describe:_____ _____
80.	Stares blankly.				
81.	Steals at home.				
82.	Steals outside the home.				
83.	Stores up too many things he/she doesn't need.				Describe:_____ _____
84.	Strange behavior.				Describe:_____ _____
85.	Strange ideas.				Describe:_____ _____
86.	Stubborn, sullen, or irritable.				
87.	Sudden changes in mood or feelings.				
88.	Sulks a lot.				
89.	Suspicious.				
90.	Swearing or obscene language.				
91.	Talks about killing self.				
92.	Talks or walks in sleep.				Describe:_____ _____ ____

APPENDIX-C **Behaviour Checklist**

93.	Talks too much.				
94.	Teases a lot.				
95.	Temper tantrums or hot temper.				
96.	Thinks about sex too much.				
97.	Threatens people.				
98.	Thumb sucking.				
99.	Smoke, chews, or sniffs tobacco.				
100.	Trouble sleeping.				Describe:_____ _____
101.	Truancy skips school.				
102.	Underactive, slow moving, or lacks energy.				
103.	Unhappy, sad, or depressed.				
104.	Unusually loud.				
105.	Uses drugs for non medical purposes (don't include tobacco or alcohol)				Describe:_____ _____
106.	Vandalism.				
107.	Wets self during the day.				
108.	Wets the bed.				
109.	Whining.				
110.	Whishes to be opposite sex.				
111.	Withdrawn, doesn't get involved with others.				
112.	Worries.				
113.	Please write in any problems your child has that were not listed above.				

APPENDIX-D **Multiple Intelligence Scale**

INSTRUCTIONS

Some statements are given below. There are four possible options for each statement. Score the statement as per the numbers given. i.e, 1 = Mostly disagree, 2=slightly disagree, 3= slightly agree, 4= Mostly agree. Answer in the white boxes only.

S. No.	Statements	Score
1.	I can play a musical instrument.	
2.	I often have a song or piece of music in my head.	
3.	I find it easy to make up stories.	
4.	I have always been physically well coordinated (run, jump, balance, etc).	
5.	Music is very important to me.	
6.	I am a good liar (if I want to be).	
7.	I play a sport or dance.	
8.	I am a very social person and like being with other people.	
9.	I find graphs, charts, and diagrams easy to understand.	
10.	I find it easy to remember quotes or phrases or poems or song lyrics.	
11.	I can always recognize places that I have been before, even when I was very young.	
12.	When I am concentrating I tend to doodle.	
13.	I find mental arithmetic easy (sums in my head).	
14.	At school one of my favorite subjects is/was English.	
15.	I like to think through a problem carefully, considering all the consequences.	
16.	I love adrenaline sports and scary rides.	
17.	I enjoy individual sports best.	
18.	I find it easy to remember telephone numbers.	
19.	I set myself goals and plans for the future.	
20.	I can tell easily whether someone likes me or dislikes me.	
21.	To learn something new, I need to just get on and try it.	
22.	I often see clear images when I close my eyes.	
23.	I don’t use my fingers when I count.	
24.	At school I love/ loved music lessons.	
25.	I find ball games easy and enjoyable.	

APPENDIX-D **Multiple Intelligence Scale**

26.	My favorite subject at school is/was maths.							
27.	I always know how I am feeling.							
28.	I keep a diary.							
29.	My favorite subject at school is/was art.							
30.	I really enjoy reading.							
31.	It upsets me to see someone cry and not be able to help.							
32.	I prefer team sports.							
33.	Singing makes me feel happy.							
34.	I am happy spending time alone.							
35.	My friends always come to me for emotional support and advice.							
36.	I like all kinds of birds and animals.							
37.	I enjoy nature and being outside.							
38.	I enjoy fishing, hunting, gardening and growing plants.							
39.	I regularly check the weather reports for changing conditions.							
40.	I make collections like rocks shells, leaves, insects, butterflies, stamps or jewellery.							

APPENDIX-E **Emotional Stability Test**

INSTRUCTIONS

Here are some statements. There are two possible alternatives –YES or NO of each statement, please choose the alternative which is applicable on you or what you are really feeling about the statement, please indicate your response by marking tick (√) on the cell below YES or NO response. As there is no right or wrong statement, please feel free to respond on all items without hesitation.

S. No.	STATEMENTS	YES	NO
1.	Do you start crying when your parents scold you?		
2.	After quarrelling with your friend or colleague do you beat him severely in anger?		
3.	Do you often feel that you have some defects in your body or mind?		
4.	After seeing someone involved in an accident, do you become nervous?		
5.	After being failed in examination, do you become very sad and stop mixing with people for sometime?		
6.	Do you beat them if your brothers and sisters quarreled on trifle matters?		
7.	When you are unable to reply in the class do you feel very much disturbed for longer period of time?		
8.	On seeing a snake, spider or any similar creatures, do you start crying?		
9.	Despite incompletion of home work, do you still feel relaxed in the class?		
10.	After stealing your friend's pencil or pen, do you sit calmly without any fear?		
11.	After mild scolding do you cry?		
12.	After obtaining your favorite things, do you become overjoyed and try to display it before others?		
13.	Do you become offended with your friends over triffle matters or things?		
14.	Do you often criticize your friends?		
15.	Do you remain unaffected even after being told odds by someone?		